

THE *N<sup>o</sup> 980*  
COUNTRY GAUGER'S  
**Made Mecum:**  
CONTAINING  
**DECIMAL TABLES**

FOR

The speedy *GAUGING* of small *Brewing Vessels*, either of a Circular, Elliptical or Rectilineal Base; and also for the *Gauging* of *Cask* in *Ale* or *Wine Measure*, either full or part empty.

By *RICHARD COLLINS*,  
*Supervisor of the Duty of EXCISE.*

The Fifth Edition, to which is added an *APPENDIX*, containing several useful Propositions performed Arithmetically and Instrumentally, with divers Tables, and the now Method of Gauging Worts in small Vessels; as also how to keep the Stock Book. In this Edition is added some few Propositions never Printed before. Written by the Author of the *Appendix*,

*RICH. WALKER*, Gauger.

London, Printed by *W. Horton*, for *William Shrovesbery* at the Sign of the Bible in *Duck-Lane*, 1688.

24 TP609  
C6  
1688

Given to the Library  
Compt. of Burlington  
by John Smith  
in 1757.

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8 Jan 45



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Gauging

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A  
**TABLE**  
 OF THE  
**CONTENTS**  
 OF  
**CYLINDERS**  
 IN  
**ALL GALLONS**  
 AND

**CENTESIMAL PARTS,**

From 1 to 60 Inches Diameter, and  
 to 31 Inches in Depth,

To every 2 Tenths, or  $\frac{1}{5}$  of an Inch,  
 in Diameter and Depth.

## A Table of Cylinders

	I	.2	.4	.6	.8
.2	0.00	0.00	0.00	0.00	0.00
.4	0.00	0.00	0.00	0.00	0.00
.6	0.00	0.00	0.00	0.00	0.00
.8	0.00	0.00	0.00	0.00	0.00
Area	0.00	0.00	0.00	0.01	0.01
2	0.00	0.00	0.01	0.01	0.02
3	0.01	0.01	0.02	0.02	0.03
4	0.01	0.02	0.02	0.03	0.04
5	0.02	0.02	0.03	0.04	0.04
6	0.02	0.02	0.03	0.04	0.05
7	0.02	0.03	0.04	0.05	0.06
8	0.02	0.03	0.04	0.06	0.07
9	0.02	0.04	0.05	0.06	0.08
10	0.03	0.04	0.05	0.07	0.09
11	0.03	0.04	0.06	0.08	0.10
12	0.03	0.05	0.07	0.09	0.11
13	0.04	0.05	0.07	0.09	0.12
14	0.04	0.06	0.08	0.10	0.13
15	0.04	0.06	0.08	0.11	0.14
16	0.04	0.06	0.09	0.11	0.14
17	0.05	0.07	0.09	0.12	0.15
18	0.05	0.07	0.10	0.12	0.16
19	0.05	0.08	0.10	0.14	0.17
20	0.06	0.08	0.11	0.14	0.18
21	0.06	0.08	0.11	0.15	0.19
22	0.06	0.09	0.12	0.16	0.20
23	0.06	0.09	0.13	0.16	0.21
24	0.07	0.10	0.13	0.17	0.22
25	0.07	0.10	0.14	0.18	0.23
26	0.07	0.10	0.14	0.19	0.24
27	0.08	0.11	0.15	0.19	0.24
28	0.08	0.11	0.15	0.20	0.25
29	0.08	0.12	0.16	0.21	0.26
30	0.08	0.12	0.16	0.21	0.27
31	0.09	0.12	0.17	0.22	0.28



	2	.2	.4	.6	.8
.2	0.00	0.00	0.00	0.00	0.00
.4	0.00	0.00	0.01	0.01	0.01
.6	0.00	0.01	0.01	0.01	0.01
.8	0.00	0.01	0.01	0.01	0.02
Area.	0.01	0.01	0.02	0.02	0.02
2	0.02	0.03	0.03	0.04	0.04
3	0.03	0.04	0.05	0.06	0.06
4	0.04	0.05	0.06	0.07	0.09
5	0.05	0.07	0.08	0.09	0.11
6	0.07	0.08	0.10	0.11	0.13
7	0.08	0.09	0.11	0.13	0.15
8	0.09	0.11	0.13	0.15	0.17
9	0.10	0.12	0.14	0.17	0.20
10	0.11	0.13	0.16	0.16	0.22
11	0.12	0.15	0.18	0.21	0.24
12	0.13	0.16	0.19	0.22	0.26
13	0.14	0.17	0.21	0.24	0.28
14	0.15	0.19	0.22	0.26	0.30
15	0.16	0.20	0.24	0.28	0.33
16	0.18	0.21	0.26	0.30	0.35
17	0.19	0.23	0.27	0.32	0.37
18	0.20	0.24	0.29	0.34	0.39
19	0.21	0.25	0.30	0.36	0.41
20	0.22	0.27	0.32	0.38	0.44
21	0.23	0.28	0.34	0.39	0.46
22	0.24	0.29	0.35	0.41	0.48
23	0.25	0.31	0.37	0.43	0.50
24	0.27	0.32	0.38	0.45	0.52
25	0.28	0.33	0.40	0.47	0.54
26	0.29	0.35	0.42	0.49	0.57
27	0.30	0.36	0.43	0.51	0.59
28	0.31	0.37	0.45	0.53	0.61
29	0.32	0.39	0.46	0.54	0.63
30	0.33	0.40	0.48	0.56	0.65
31	0.34	0.41	0.50	0.58	0.67

## A Table of Cylinders

	3	.2	.4	.6	.8
.2	0.00	0.00	0.01	0.01	0.01
.4	0.01	0.01	0.01	0.01	0.02
.6	0.02	0.02	0.02	0.02	0.02
.8	0.02	0.02	0.02	0.03	0.03
<i>Area.</i>	0.02	0.03	0.03	0.04	0.04
2	0.05	0.06	0.06	0.07	0.08
3	0.07	0.08	0.10	0.11	0.12
4	0.10	0.11	0.13	0.14	0.16
5	0.12	0.14	0.16	0.18	0.20
6	0.15	0.17	0.19	0.22	0.24
7	0.17	0.20	0.22	0.25	0.28
8	0.20	0.23	0.26	0.29	0.32
9	0.22	0.26	0.29	0.32	0.36
10	0.25	0.29	0.32	0.36	0.40
11	0.28	0.31	0.35	0.40	0.44
12	0.30	0.34	0.39	0.43	0.48
13	0.33	0.37	0.42	0.47	0.52
14	0.35	0.40	0.45	0.50	0.56
15	0.38	0.43	0.48	0.54	0.60
16	0.40	0.46	0.51	0.58	0.64
17	0.43	0.49	0.55	0.61	0.68
18	0.45	0.51	0.58	0.65	0.72
19	0.48	0.54	0.61	0.68	0.76
20	0.50	0.57	0.64	0.72	0.80
21	0.53	0.60	0.68	0.76	0.84
22	0.55	0.63	0.71	0.79	0.88
23	0.58	0.66	0.74	0.83	0.92
24	0.60	0.69	0.77	0.87	0.96
25	0.63	0.71	0.80	0.90	1.00
26	0.65	0.74	0.84	0.94	1.04
27	0.68	0.77	0.87	0.97	1.08
28	0.70	0.80	0.90	1.01	1.12
29	0.73	0.83	0.93	1.05	1.16
30	0.75	0.86	0.97	1.08	1.21
31	0.78	0.89	1.00	1.12	1.25

in Ale Gallons.

5

	4	.2	.4	.6	.8
.2	0.01	0.01	0.01	0.01	0.01
.4	0.02	0.02	0.02	0.02	0.02
.6	0.03	0.03	0.03	0.03	0.04
.8	0.03	0.04	0.04	0.05	0.05
Area.	0.04	0.05	0.05	0.06	0.06
2	0.09	0.10	0.11	0.12	0.13
3	0.13	0.15	0.16	0.18	0.19
4	0.18	0.20	0.22	0.23	0.26
5	0.22	0.25	0.27	0.29	0.32
6	0.27	0.29	0.32	0.35	0.38
7	0.31	0.34	0.38	0.41	0.45
8	0.36	0.39	0.43	0.47	0.51
9	0.40	0.44	0.49	0.53	0.58
10	0.45	0.49	0.54	0.59	0.64
11	0.49	0.54	0.59	0.65	0.71
12	0.53	0.59	0.65	0.71	0.77
13	0.58	0.64	0.70	0.76	0.83
14	0.62	0.69	0.76	0.82	0.90
15	0.67	0.74	0.81	0.88	0.96
16	0.71	0.79	0.86	0.94	1.02
17	0.76	0.84	0.92	1.00	1.09
18	0.80	0.88	0.97	1.06	1.15
19	0.84	0.93	1.03	1.12	1.21
20	0.89	0.98	1.08	1.18	1.28
21	0.94	1.03	1.13	1.24	1.35
22	0.98	1.08	1.19	1.29	1.41
23	1.02	1.13	1.24	1.35	1.48
24	1.07	1.18	1.30	1.41	1.54
25	1.11	1.23	1.35	1.47	1.60
26	1.16	1.28	1.40	1.53	1.67
27	1.20	1.33	1.46	1.59	1.73
28	1.25	1.38	1.51	1.65	1.80
29	1.29	1.43	1.57	1.71	1.86
30	1.34	1.48	1.62	1.77	1.93
31	1.38	1.52	1.67	1.82	1.90

## A Table of Cylinders

	5	.2	.4	.6	.8
.2	0.01	0.01	0.02	0.02	0.02
.4	0.03	0.03	0.03	0.03	0.04
.6	0.04	0.04	0.05	0.05	0.06
.8	0.05	0.06	0.06	0.07	0.07
<i>Area.</i>	0.07	0.07	0.08	0.09	0.09
2	0.14	0.15	0.16	0.17	0.19
3	0.21	0.22	0.24	0.26	0.28
4	0.28	0.30	0.32	0.35	0.37
5	0.35	0.38	0.41	0.44	0.47
6	0.42	0.45	0.49	0.52	0.56
7	0.49	0.53	0.57	0.61	0.65
8	0.56	0.60	0.65	0.70	0.75
9	0.63	0.68	0.73	0.78	0.84
10	0.70	0.75	0.81	0.87	0.94
11	0.76	0.83	0.89	0.96	1.03
12	0.83	0.90	0.97	1.05	1.12
13	0.90	0.98	1.05	1.13	1.22
14	0.97	1.05	1.14	1.22	1.31
15	1.04	1.13	1.22	1.31	1.40
16	1.11	1.20	1.30	1.40	1.50
17	1.18	1.28	1.38	1.48	1.59
18	1.25	1.35	1.46	1.57	1.68
19	1.32	1.43	1.54	1.66	1.78
20	1.39	1.50	1.62	1.75	1.87
21	1.46	1.58	1.70	1.83	1.96
22	1.53	1.66	1.79	1.92	2.06
23	1.60	1.73	1.87	2.01	2.15
24	1.67	1.81	1.95	2.09	2.25
25	1.74	1.88	2.03	2.18	2.34
26	1.81	1.96	2.11	2.27	2.43
27	1.88	2.03	2.19	2.36	2.53
28	1.95	2.11	2.27	2.44	2.62
29	2.02	2.18	2.35	2.53	2.71
30	2.09	2.26	2.44	2.62	2.81
31	2.16	2.33	2.52	2.71	2.90



# in Ale Gallons.

7

	6	.2	.4	.6	.8
.2	0.02	0.02	0.02	0.02	0.02
.4	0.04	0.04	0.04	0.05	0.05
.6	0.06	0.06	0.07	0.07	0.08
.8	0.08	0.08	0.09	0.10	0.10
<i>Area.</i>	0.10	0.11	0.11	0.12	0.13
2	0.20	0.21	0.23	0.24	0.26
3	0.30	0.32	0.34	0.36	0.39
4	0.40	0.43	0.46	0.48	0.51
5	0.50	0.54	0.57	0.61	0.64
6	0.60	0.64	0.68	0.73	0.77
7	0.70	0.75	0.80	0.85	0.90
8	0.80	0.86	0.91	0.97	1.03
9	0.90	0.96	1.03	1.09	1.16
10	1.00	1.07	1.14	1.21	1.29
11	1.10	1.18	1.26	1.33	1.42
12	1.20	1.29	1.37	1.45	1.54
13	1.30	1.39	1.48	1.58	1.67
14	1.40	1.50	1.60	1.70	1.80
15	1.50	1.61	1.71	1.82	1.93
16	1.60	1.71	1.83	1.94	2.06
17	1.70	1.82	1.94	2.06	2.19
18	1.80	1.93	2.05	2.18	2.32
19	1.90	2.04	2.17	2.30	2.45
20	2.01	2.14	2.28	2.43	2.58
21	2.11	2.25	2.40	2.55	2.70
22	2.21	2.36	2.51	2.67	2.83
23	2.31	2.46	2.63	2.79	2.96
24	2.41	2.57	2.74	2.91	3.09
25	2.51	2.68	2.85	3.03	3.22
26	2.61	2.79	2.97	3.15	3.35
27	2.71	2.89	3.08	3.27	3.48
28	2.81	3.00	3.20	3.40	3.61
29	2.91	3.11	3.31	3.52	3.73
30	3.01	3.22	3.43	3.64	3.86
31	3.11	3.32	3.54	3.76	3.99

## A Table of Cylinders

	7	.2	.4	.6	.8
.2	0.03	0.03	0.03	0.03	0.03
.4	0.05	0.06	0.06	0.06	0.07
.6	0.08	0.09	0.09	0.10	0.10
.8	0.11	0.11	0.12	0.13	0.13
Area.	0.14	0.14	0.15	0.16	0.17
2	0.27	0.29	0.30	0.32	0.34
3	0.41	0.43	0.45	0.48	0.51
4	0.55	0.58	0.61	0.64	0.68
5	0.68	0.72	0.76	0.80	0.85
6	0.82	0.87	0.91	0.96	1.02
7	0.95	1.01	1.07	1.13	1.19
8	1.09	1.15	1.22	1.29	1.36
9	1.23	1.30	1.37	1.45	1.52
10	1.36	1.44	1.52	1.61	1.69
11	1.50	1.59	1.68	1.77	1.86
12	1.63	1.73	1.83	1.93	2.03
13	1.77	1.88	1.98	2.09	2.20
14	1.91	2.02	2.13	2.25	2.37
15	2.05	2.17	2.29	2.41	2.54
16	2.18	2.31	2.44	2.57	2.71
17	2.32	2.45	2.59	2.73	2.88
18	2.46	2.60	2.74	2.90	3.05
19	2.59	2.74	2.90	3.06	3.22
20	2.73	2.89	3.05	3.22	3.39
21	2.87	3.03	3.20	3.38	3.56
22	3.00	3.18	3.35	3.54	3.73
23	3.14	3.32	3.51	3.71	3.90
24	3.28	3.46	3.66	3.86	4.07
25	3.41	3.61	3.81	4.02	4.24
26	3.55	3.75	3.96	4.18	4.41
27	3.68	3.90	4.12	4.34	4.58
28	3.82	4.04	4.27	4.50	4.75
29	3.96	4.19	4.42	4.67	4.91
30	4.09	4.33	4.57	4.83	5.08
31	4.23	4.48	4.73	4.99	5.25

	8	.2	.4	.6	.8
.2	0.03	0.04	0.04	0.04	0.54
.4	0.07	0.07	0.08	0.08	0.09
.6	0.11	0.11	0.12	0.12	0.13
.8	0.14	0.15	0.16	0.16	0.17
<i>Area.</i>	0.18	0.19	0.20	0.21	0.21
2	0.36	0.37	0.40	0.41	0.43
3	0.53	0.56	0.59	0.62	0.65
4	0.71	0.75	0.78	0.82	0.86
5	0.89	0.93	0.98	1.03	1.08
6	1.07	1.12	1.18	1.24	1.29
7	1.25	1.31	1.37	1.44	1.51
8	1.42	1.50	1.57	1.65	1.78
9	1.60	1.68	1.77	1.85	1.94
10	1.78	1.87	1.96	2.06	2.16
11	1.96	2.06	2.16	2.26	2.37
12	2.14	2.24	2.36	2.47	2.59
13	2.32	2.43	2.55	2.68	2.80
14	2.49	2.62	2.75	2.88	3.02
15	2.67	2.81	2.95	3.09	3.24
16	2.85	2.99	3.14	3.29	3.45
17	3.03	3.18	3.34	3.50	3.67
18	3.21	3.37	3.53	3.71	3.88
19	3.38	3.55	3.73	3.91	4.10
20	3.56	3.74	3.93	4.12	4.32
21	3.74	3.93	4.12	4.33	4.53
22	3.92	4.12	4.32	4.53	4.75
23	4.10	4.30	4.52	4.74	4.96
24	4.28	4.49	4.71	4.94	5.18
25	4.45	4.68	4.91	5.15	5.39
26	4.63	4.86	5.11	5.36	5.61
27	4.81	5.05	5.30	5.56	5.83
28	4.99	5.24	5.50	5.77	6.04
29	5.17	5.42	5.69	5.97	6.26
30	5.35	5.61	5.89	6.18	6.47
31	5.52	5.80	6.09	6.39	6.69

## A Table of Cylinders

	9	.2	.4	.6	.8
.2	0.04	0.05	0.05	0.05	0.05
.4	0.09	0.10	0.10	0.10	0.11
.6	0.13	0.15	0.14	0.15	0.16
.8	0.18	0.19	0.20	0.20	0.21
<i>Area.</i>	0.22	0.23	0.25	0.26	0.27
2	0.45	0.47	0.49	0.51	0.53
3	0.68	0.70	0.74	0.77	0.80
4	0.90	0.94	0.98	1.03	1.07
5	1.13	1.18	1.23	1.38	1.34
6	1.35	1.41	1.48	1.54	1.60
7	1.58	1.65	1.72	1.80	1.87
8	1.80	1.88	1.97	2.05	2.14
9	2.03	2.12	2.21	2.31	2.41
10	2.26	2.36	2.46	2.57	2.67
11	2.48	2.59	2.71	2.82	2.94
12	2.71	2.83	2.95	3.08	3.21
13	2.93	3.06	3.20	3.33	3.48
14	3.16	3.30	3.44	3.59	3.74
15	3.38	3.53	3.69	3.85	4.01
16	3.61	3.77	3.94	4.11	4.28
17	3.83	4.01	4.18	4.36	4.54
18	4.06	4.24	4.43	4.62	4.81
19	4.29	4.48	4.67	4.88	5.08
20	4.51	4.71	4.92	5.13	5.35
21	4.74	4.95	5.17	5.39	5.61
22	4.96	5.18	5.41	5.65	5.88
23	5.19	5.42	5.66	5.90	6.15
24	5.41	5.66	5.91	6.16	6.42
25	5.64	5.89	6.15	6.42	6.68
26	5.86	6.13	6.40	6.67	6.95
27	6.09	6.36	6.64	6.93	7.22
28	6.32	6.60	6.89	7.19	7.49
29	6.54	6.83	7.14	7.44	7.75
30	6.77	7.07	7.38	7.70	8.02
31	6.99	7.31	7.63	7.96	8.29



in Ale Gallons.

11

	10	.2	.4	.6	.8
.2	0.05	0.05	0.06	0.06	0.06
.4	0.11	0.11	0.12	0.12	0.13
.6	0.16	0.17	0.18	0.19	0.19
.8	0.22	0.23	0.24	0.25	0.26
<i>Area.</i>	0.28	0.29	0.30	0.31	0.32
2	0.56	0.58	0.60	0.63	0.65
3	0.83	0.87	0.90	0.94	0.97
4	1.11	1.16	1.20	1.25	1.30
5	1.39	1.45	1.51	1.56	1.62
6	1.67	1.74	1.81	1.88	1.96
7	1.95	2.03	2.11	2.19	2.27
8	2.23	2.32	2.41	2.50	2.60
9	2.51	2.61	2.71	2.81	2.92
10	2.78	2.90	3.01	3.13	3.25
11	3.06	3.19	3.31	3.44	3.57
12	3.34	3.48	3.61	3.75	3.90
13	3.62	3.77	3.92	4.07	4.22
14	3.90	4.06	4.22	4.38	4.55
15	4.18	4.35	4.52	4.69	4.87
16	4.46	4.64	4.82	5.01	5.20
17	4.73	4.93	5.12	5.32	5.52
18	5.01	5.22	5.42	5.63	5.85
19	5.29	5.51	5.72	5.95	6.17
20	5.57	5.80	6.03	6.26	6.50
21	5.85	6.08	6.33	6.57	6.82
22	6.13	6.37	6.63	6.89	7.15
23	6.40	6.66	6.93	7.20	7.47
24	6.68	6.95	7.23	7.51	7.80
25	6.96	7.24	7.53	7.82	8.12
26	7.24	7.53	7.83	8.14	8.45
27	7.52	7.82	8.13	8.45	8.77
28	7.80	8.11	8.44	8.76	9.10
29	8.08	8.40	8.74	9.08	9.42
30	8.35	8.69	9.04	9.39	9.75
31	8.63	8.98	9.34	9.70	10.07

## A Table of Cylinders

	1	.2	.4	.6	.8
.2	0.07	0.07	0.07	0.07	0.08
.4	0.13	0.14	0.14	0.15	0.15
.6	0.20	0.21	0.22	0.22	0.23
.8	0.27	0.28	0.29	0.30	0.31
Area	0.34	0.35	0.36	0.37	0.39
2	0.67	0.70	0.72	0.75	0.77
3	1.01	1.05	1.08	1.12	1.16
4	1.35	1.40	1.45	1.50	1.54
5	1.68	1.75	1.81	1.87	1.94
6	2.02	2.09	2.17	2.25	2.33
7	2.36	2.44	2.53	2.62	2.71
8	2.70	2.79	2.90	2.99	3.10
9	3.03	3.14	3.26	3.37	3.49
10	3.37	3.49	3.62	3.75	3.88
11	3.71	3.84	3.98	4.12	4.26
12	4.04	4.19	4.34	4.49	4.65
13	4.38	4.54	4.70	4.87	5.04
14	4.72	4.89	5.06	5.24	5.43
15	5.05	5.24	5.43	5.62	5.81
16	5.39	5.59	5.79	5.99	6.20
17	5.73	5.94	6.15	6.37	6.59
18	6.07	6.29	6.51	6.74	6.98
19	6.40	6.64	6.87	7.12	7.37
20	6.74	6.99	7.24	7.49	7.75
21	7.08	7.33	7.60	7.87	8.14
22	7.41	7.68	7.96	8.24	8.53
23	7.75	8.03	8.32	8.61	8.92
24	8.09	8.38	8.68	8.99	9.30
25	8.42	8.73	9.04	9.36	9.69
26	8.76	9.08	9.41	9.74	10.08
27	9.10	9.43	9.77	10.11	10.47
28	9.44	9.78	10.13	10.49	10.85
29	9.77	10.13	10.49	10.86	11.24
30	10.11	10.48	10.85	11.24	11.63
31	10.45	10.83	11.21	11.61	12.02

in Ale Gallons.

13

	12	.2	.4	.6	.8
.2	0.08	0.08	0.08	0.09	0.09
.4	0.16	0.16	0.17	0.18	0.18
.6	0.24	0.25	0.26	0.26	0.27
.8	0.32	0.33	0.34	0.35	0.36
Area.	0.40	0.41	0.43	0.44	0.46
2	0.80	0.83	0.86	0.88	0.91
3	1.20	1.24	1.28	1.33	1.37
4	1.60	1.66	1.71	1.77	1.82
5	2.00	2.07	2.14	2.21	2.28
6	2.41	2.49	2.57	2.65	2.74
7	2.81	2.90	3.00	3.09	3.19
8	3.21	3.32	3.43	3.54	3.65
9	3.61	3.73	3.85	3.98	4.11
10	4.01	4.13	4.28	4.42	4.56
11	4.41	4.56	4.71	4.86	5.02
12	4.81	4.98	5.14	5.31	5.47
13	5.21	5.39	5.57	5.75	5.93
14	5.61	5.80	6.00	6.19	6.39
15	6.02	6.22	6.43	6.63	6.84
16	6.42	6.63	6.85	7.07	7.30
17	6.82	7.05	7.28	7.52	7.76
18	7.22	7.46	7.71	7.96	8.21
19	7.62	7.88	8.14	8.40	8.67
20	8.02	8.29	8.57	8.84	9.13
21	8.42	8.71	9.00	9.29	9.58
22	8.82	9.12	9.42	9.73	10.04
23	9.22	9.54	9.85	10.17	10.49
24	9.63	9.95	10.28	10.61	10.95
25	10.03	10.37	10.71	11.05	11.41
26	10.43	10.78	11.14	11.50	11.86
27	10.83	11.20	11.57	11.94	12.32
28	11.23	11.61	11.99	12.38	12.78
29	11.63	12.03	12.42	12.82	13.23
30	12.03	12.44	12.85	13.27	13.69
31	12.43	12.85	13.28	13.71	14.14

B

## A Table of Cylinders

	13	.2	.4	.6	.8
.2	0.09	0.10	0.10	0.10	0.11
.4	0.19	0.19	0.20	0.21	0.21
.6	0.28	0.29	0.30	0.31	0.32
.8	0.38	0.39	0.40	0.41	0.42
<i>Area.</i>	0.47	0.48	0.50	0.51	0.53
2	0.94	0.97	1.00	1.03	1.06
3	1.41	1.45	1.50	1.54	1.60
4	1.88	1.94	2.00	2.06	2.12
5	2.35	2.43	2.50	2.57	2.65
6	2.82	2.91	3.00	3.09	3.18
7	3.29	3.49	3.50	3.60	3.71
8	3.76	3.88	4.00	4.12	4.24
9	4.24	4.37	4.50	4.63	4.77
10	4.71	4.85	5.00	5.15	5.30
11	5.18	5.34	5.50	5.67	5.83
12	5.65	5.82	6.00	6.18	6.36
13	6.12	6.31	6.50	6.70	6.89
14	6.59	6.79	7.00	7.21	7.42
15	7.06	7.28	7.50	7.72	7.96
16	7.53	7.76	8.00	8.24	8.49
17	8.00	8.25	8.50	8.75	9.02
18	8.47	8.73	9.00	9.27	9.55
19	8.94	9.22	9.50	9.79	10.07
20	9.41	9.71	10.00	10.30	10.60
21	9.88	10.19	10.50	10.82	11.12
22	10.35	10.68	11.00	11.33	11.67
23	10.83	11.16	11.50	11.85	12.20
24	11.30	11.65	12.00	12.36	12.73
25	11.77	12.13	12.50	12.88	13.26
26	12.24	12.62	13.00	13.39	13.79
27	12.71	13.10	13.50	13.91	14.32
28	13.18	13.59	14.00	14.42	14.85
29	13.65	14.07	14.50	14.94	15.38
30	14.12	14.56	15.00	15.45	15.91
31	14.50	15.04	15.50	15.97	16.44



in Ale Gallons.

15

	.1	.2	.4	.6	.8
.2	0.11	0.11	0.11	0.12	0.12
.4	0.22	0.22	0.23	0.24	0.24
.6	0.33	0.34	0.35	0.36	0.37
.8	0.44	0.45	0.46	0.47	0.49
Area.	0.54	0.56	0.58	0.59	0.61
2	1.09	1.12	1.15	1.19	1.22
3	1.64	1.68	1.73	1.78	1.83
4	2.18	2.25	2.31	2.37	2.44
5	2.73	2.81	2.89	2.97	3.05
6	3.27	3.37	3.46	3.56	3.66
7	3.82	3.93	4.04	4.15	4.27
8	4.37	4.49	4.62	4.75	4.88
9	4.91	5.05	5.20	5.34	5.49
10	5.46	5.62	5.77	5.94	6.10
11	6.00	6.18	6.35	6.53	6.71
12	6.55	6.74	6.93	7.12	7.32
13	7.10	7.30	7.51	7.72	7.93
14	7.64	7.86	8.08	8.31	8.54
15	8.19	8.42	8.66	8.90	9.15
16	8.73	8.98	9.24	9.50	9.76
17	9.28	9.55	9.82	10.09	10.37
18	9.83	10.11	10.39	10.69	10.98
19	10.37	10.67	10.97	11.28	11.59
20	10.91	11.23	11.55	11.87	12.20
21	11.46	11.79	12.13	12.47	12.81
22	12.01	12.35	12.70	13.06	13.42
23	12.55	12.92	13.28	13.66	14.03
24	13.10	13.48	13.86	14.25	14.64
25	13.65	14.04	14.44	14.84	15.25
26	14.19	14.60	15.05	15.45	15.86
27	14.74	15.16	15.59	16.03	16.47
28	15.28	15.72	16.17	16.63	17.08
29	15.83	16.29	16.75	17.22	17.69
30	16.38	16.85	17.32	17.81	18.30
31	16.92	17.11	17.90	18.41	18.91

## A Table of Cylinders

	.15	.2	.4	.5	.8
.2	0.12	0.13	0.13	0.13	0.14
.4	0.25	0.26	0.26	0.27	0.28
.6	0.37	0.38	0.40	0.41	0.42
.8	0.50	0.51	0.53	0.54	0.56
Area.	0.63	0.64	0.66	0.68	0.69
2	1.25	1.29	1.32	1.35	1.39
3	1.88	1.93	1.98	2.03	2.08
4	2.51	2.57	2.64	2.71	2.78
5	3.13	3.22	3.30	3.39	3.48
6	3.76	3.86	3.96	4.07	4.17
7	4.39	4.50	4.62	4.74	4.87
8	5.01	5.15	5.28	5.42	5.56
9	5.64	5.79	5.94	6.10	6.26
10	6.27	6.43	6.60	6.78	6.95
11	6.89	7.08	7.26	7.45	7.65
12	7.52	7.72	7.92	8.13	8.34
13	8.14	8.36	8.58	8.81	9.04
14	8.77	9.01	9.24	9.49	9.73
15	9.40	9.65	9.91	10.17	10.43
16	10.02	10.29	10.57	10.84	11.12
17	10.65	10.94	11.23	11.52	11.82
18	11.28	11.58	11.89	12.20	12.51
19	11.90	12.22	12.55	12.88	13.21
20	12.53	12.87	13.21	13.56	13.91
21	13.16	13.51	13.87	14.23	14.60
22	13.78	14.15	14.53	14.91	15.30
23	14.41	14.79	15.19	15.59	15.99
24	15.04	15.54	15.85	16.27	16.69
25	15.66	16.08	16.51	16.94	17.38
26	16.29	16.72	17.17	17.62	18.08
27	16.92	17.37	17.83	18.30	18.77
28	17.54	18.01	18.49	18.98	19.47
29	18.17	18.65	19.15	19.66	20.16
30	18.80	19.30	19.81	20.33	20.86
31	19.42	19.94	20.47	21.01	21.55

	16	.2	.4	.6	.8
.2	0.14	0.15	0.15	0.15	0.16
.4	0.29	0.29	0.30	0.31	0.31
.6	0.44	0.44	0.45	0.46	0.47
.8	0.58	0.58	0.60	0.61	0.63
Area.	0.71	0.73	0.75	0.77	0.79
2	1.43	1.46	1.50	1.53	1.57
3	2.14	2.19	2.25	2.30	2.36
4	2.85	2.92	3.00	3.07	3.14
5	3.56	3.65	3.74	3.84	3.93
6	4.28	4.38	4.49	4.60	4.72
7	4.99	5.12	5.24	5.37	5.50
8	5.70	5.85	5.99	6.14	6.29
9	6.42	6.58	6.77	6.91	7.07
10	7.13	7.31	7.49	7.67	7.86
11	7.84	8.04	8.24	8.44	8.68
12	8.56	8.77	8.99	9.21	9.43
13	9.27	9.50	9.74	9.98	10.22
14	9.98	10.23	10.44	10.74	11.00
15	10.70	10.96	11.23	11.51	11.79
16	11.40	11.69	11.98	12.28	12.58
17	12.12	12.42	12.73	13.04	13.36
18	12.83	13.16	13.48	13.81	14.25
19	13.55	13.89	14.23	14.58	14.93
20	14.26	14.62	14.98	15.34	15.72
21	14.97	15.35	15.73	16.11	16.50
22	15.69	16.08	16.48	16.88	17.29
23	16.40	16.81	17.23	17.65	18.08
24	17.11	17.54	17.98	18.42	18.86
25	18.83	18.27	18.73	19.18	19.65
26	18.54	19.00	19.47	19.95	20.44
27	19.25	19.73	20.22	20.72	21.22
28	19.96	20.46	20.97	21.49	22.01
29	20.67	21.20	21.72	22.25	22.79
30	21.39	21.93	22.47	23.02	23.58
31	22.10	22.66	23.21	23.79	24.37

## A Table of Cylinders

	.1	.2	.4	.6	.8
.2	0.16	0.16	0.17	0.17	0.18
.4	0.32	0.33	0.34	0.34	0.35
.6	0.48	0.49	0.50	0.52	0.53
.8	0.64	0.66	0.67	0.69	0.70
Area.	0.80	0.83	0.84	0.86	0.88
2	1.61	1.65	1.69	1.72	1.76
3	2.41	2.47	2.53	2.59	2.65
4	3.22	3.29	3.37	3.45	3.53
5	4.02	4.12	4.22	4.31	4.41
6	4.83	4.94	5.06	5.18	5.29
7	5.63	5.77	5.90	6.04	6.18
8	6.44	6.60	6.74	6.90	7.06
9	7.24	7.41	7.59	7.76	7.94
10	8.05	8.24	8.43	8.63	8.82
11	8.85	9.06	9.27	9.49	9.70
12	9.66	9.89	10.12	10.35	10.59
13	10.46	10.71	10.96	11.21	11.47
14	11.27	11.53	11.80	12.08	12.35
15	12.07	12.36	12.65	12.94	13.24
16	12.88	13.20	13.49	13.80	14.12
17	13.68	14.01	14.33	14.66	15.00
18	14.49	14.83	15.18	15.52	15.88
19	15.29	15.65	16.02	16.39	16.76
20	16.10	16.48	16.86	17.25	17.65
21	16.90	17.30	17.71	18.12	18.53
22	17.71	18.12	18.55	18.98	19.41
23	18.51	18.95	19.39	19.84	20.29
24	19.32	19.77	20.24	20.70	21.18
25	20.12	20.60	21.08	21.57	22.06
26	20.93	21.42	21.92	22.43	22.94
27	21.73	22.24	22.77	23.29	23.82
28	22.54	23.07	23.61	24.15	24.71
29	23.34	23.89	24.45	25.02	25.59
30	24.14	24.72	25.30	25.88	26.47
31	24.95	25.54	26.14	26.74	27.35



# in Ale Gallons.

19

	18	.2	.4	.6	.8
.2	0.18	0.18	0.19	0.19	0.20
.4	0.36	0.37	0.38	0.38	0.39
.6	0.54	0.55	0.56	0.58	0.59
.8	0.72	0.74	0.75	0.77	0.79
<i>Aren.</i>	0.90	0.92	0.94	0.96	0.98
2	1.80	1.84	1.88	1.93	1.97
3	2.71	2.77	2.83	2.89	2.95
4	3.61	3.69	3.77	3.85	3.94
5	4.51	4.61	4.71	4.82	4.92
6	5.41	5.53	5.66	5.78	5.91
7	6.32	6.46	6.60	6.74	6.89
8	7.22	7.38	7.54	7.71	7.89
9	8.12	8.30	8.49	8.67	8.84
10	9.02	9.23	9.43	9.64	9.83
11	9.93	10.15	10.37	10.60	10.83
12	10.83	11.07	11.31	11.56	11.81
13	11.73	11.99	12.26	12.53	12.80
14	12.63	12.92	13.20	13.49	13.78
15	13.54	13.84	14.14	14.45	14.77
16	14.44	14.76	15.09	15.42	15.75
17	15.34	15.68	16.03	16.38	16.73
18	16.24	16.61	16.97	17.34	17.72
19	17.14	17.53	17.91	18.31	18.70
20	18.05	18.45	18.86	19.27	19.69
21	18.95	19.37	19.80	20.23	20.67
22	19.85	20.30	20.74	21.20	21.66
23	20.75	21.22	21.69	22.16	22.64
24	21.66	22.14	22.63	23.13	23.62
25	22.56	23.06	23.57	24.09	24.61
26	23.46	23.99	24.51	25.05	25.59
27	24.36	24.91	25.46	26.02	26.58
28	25.27	25.83	26.40	26.98	27.56
29	26.17	26.75	27.34	27.94	28.55
30	27.07	27.68	28.29	28.91	29.53
31	27.97	28.60	29.33	29.87	30.52

## A Table of Cylinders

	.19	.2	.4	.6	.8
.2	0.20	0.20	0.21	0.21	0.22
.4	0.40	0.41	0.42	0.43	0.44
.6	0.60	0.61	0.63	0.64	0.65
.8	0.80	0.82	0.84	0.85	0.87
Area.	1.00	1.03	1.05	1.07	1.09
2	2.01	2.05	2.10	2.14	2.18
3	3.01	3.08	3.14	3.21	3.27
4	4.02	4.11	4.19	4.28	4.37
5	5.03	5.13	5.24	5.35	5.46
6	6.03	6.16	6.29	6.42	6.55
7	7.04	7.19	7.34	7.49	7.64
8	8.04	8.21	8.38	8.56	8.73
9	9.05	9.24	9.43	9.63	9.83
10	10.05	10.27	10.48	10.70	10.92
11	11.06	11.29	11.53	11.77	12.01
12	12.06	12.32	12.58	12.84	13.10
13	13.07	13.35	13.63	13.91	14.19
14	14.07	14.37	14.67	14.98	15.29
15	15.08	15.40	15.72	16.05	16.38
16	16.09	16.43	16.77	17.12	17.47
17	17.09	17.45	17.82	18.19	18.56
18	18.10	18.48	18.87	19.26	19.65
19	19.10	19.51	19.91	20.33	20.74
20	20.11	20.53	20.96	21.40	21.84
21	21.11	21.56	22.01	22.47	22.93
22	22.12	22.59	23.06	23.54	24.02
23	23.12	23.61	24.11	24.61	25.11
24	24.13	24.64	25.16	25.68	26.20
25	25.13	25.67	26.20	26.75	27.30
26	26.14	26.69	27.25	27.82	28.39
27	27.14	27.72	28.30	28.89	29.48
28	28.15	28.75	29.35	29.96	30.57
29	29.16	29.77	30.40	31.03	31.66
30	30.16	30.80	31.45	32.10	32.76
31	31.17	31.83	32.49	33.17	33.85

	20	.2	.4	.6	.8
.2	0.22	0.23	0.23	0.24	0.24
.4	0.44	0.45	0.46	0.47	0.48
.6	0.67	0.68	0.69	0.71	0.72
.8	0.89	0.91	0.93	0.94	0.96
<i>Area</i>	1.11	1.14	1.16	1.18	1.20
2	2.23	2.27	2.32	2.36	2.41
3	3.34	3.41	3.48	3.54	3.61
4	4.46	4.54	4.64	4.73	4.82
5	5.57	5.68	5.79	5.91	6.02
6	6.68	6.82	6.95	7.09	7.23
7	7.80	7.95	8.11	8.27	8.43
8	8.91	9.09	9.27	9.45	9.64
9	10.03	10.23	10.43	10.64	10.84
10	11.14	11.36	11.59	11.82	12.05
11	12.25	12.50	12.75	13.00	13.25
12	13.37	13.63	13.91	14.18	14.46
13	14.48	14.77	15.07	15.36	15.66
14	15.60	15.91	16.23	16.54	16.87
15	16.71	17.04	17.38	17.73	18.07
16	17.82	18.18	18.54	18.91	19.28
17	18.94	19.32	19.70	20.09	20.48
18	20.05	20.45	20.86	21.27	21.69
19	21.17	21.59	22.02	22.45	22.89
20	22.28	22.73	23.18	23.64	24.10
21	23.39	23.86	24.34	24.82	25.30
22	24.51	25.00	25.50	26.00	26.51
23	25.62	26.13	26.66	27.18	27.71
24	26.74	27.27	27.82	28.36	28.92
25	27.85	28.41	28.97	29.54	30.12
26	28.96	29.54	30.13	30.73	31.33
27	30.08	30.68	31.29	31.91	32.53
28	31.19	31.82	32.45	33.09	33.74
29	32.31	32.95	33.61	34.27	34.94
30	33.42	34.09	34.77	35.45	36.15
31	34.53	35.21	35.93	36.63	37.35



## A Table of Cylinders

	.2	.4	.6	.8
.2	0.24	0.25	0.25	0.26
.4	0.49	0.50	0.51	0.53
.6	0.74	0.57	0.76	0.79
.8	0.98	1.00	1.02	1.06
Area.	1.23	1.25	1.27	1.32
2	2.46	2.50	2.55	2.60
3	3.68	3.75	3.83	3.90
4	4.91	5.01	5.10	5.20
5	6.14	6.26	6.38	6.50
6	7.37	7.51	7.65	7.80
7	8.60	8.76	8.93	9.09
8	9.82	10.01	10.20	10.39
9	11.05	11.26	11.48	11.69
10	12.28	12.52	12.75	12.99
11	13.51	13.77	14.03	14.29
12	14.74	15.02	15.31	15.59
13	15.97	16.27	16.58	16.89
14	17.19	17.52	17.86	18.19
15	18.42	18.77	19.13	19.49
16	19.65	20.03	20.41	20.79
17	20.88	21.28	21.68	22.09
18	22.11	22.53	22.96	23.39
19	23.33	23.78	24.23	24.69
20	24.56	25.03	25.51	25.99
21	25.79	26.28	26.78	27.29
22	27.02	27.54	28.06	28.59
23	28.25	28.79	29.34	29.89
24	29.48	30.04	30.61	31.18
25	30.70	31.29	31.89	32.48
26	31.93	32.54	33.16	33.78
27	33.16	33.79	34.44	35.08
28	34.39	35.05	35.71	36.38
29	35.62	36.30	36.99	37.68
30	36.85	37.55	38.26	38.98
31	38.07	38.80	39.54	40.28
				41.03



	22	.2	.4	.6	.8
.2	0.27	0.27	0.38	0.28	0.29
.4	0.54	0.55	0.86	0.57	0.58
.6	0.80	0.82	0.84	0.85	0.87
.8	1.08	1.10	1.12	1.14	1.16
Area.	1.35	1.37	1.40	1.42	1.45
2	2.70	2.74	2.79	2.84	2.89
3	4.04	4.12	4.19	4.27	4.34
4	5.39	5.49	5.59	5.69	5.79
5	6.74	6.86	6.99	7.11	7.24
6	8.09	8.24	8.38	8.53	8.69
7	9.44	9.61	9.78	9.96	10.13
8	10.78	10.98	11.18	11.38	11.58
9	12.13	12.35	12.58	12.80	13.03
10	13.48	13.73	13.97	14.22	14.48
11	14.83	15.10	15.37	15.65	15.92
12	16.18	16.47	16.77	17.07	17.37
13	17.52	17.84	18.17	18.49	18.82
14	18.87	19.22	19.56	19.91	20.27
15	20.22	20.59	20.96	21.34	21.72
16	21.57	21.96	22.36	22.76	23.16
17	22.92	23.33	23.76	24.18	24.61
18	24.26	24.71	25.15	25.60	26.06
19	25.61	26.08	26.55	27.03	27.51
20	26.96	27.45	27.95	28.45	28.96
21	28.31	28.83	29.35	29.87	30.40
22	29.66	30.20	30.74	31.29	31.85
23	31.00	31.57	32.14	32.72	33.30
24	32.35	32.94	33.54	34.14	34.75
25	33.70	34.32	34.94	35.56	36.19
26	35.05	35.69	36.33	36.98	37.64
27	36.40	37.06	37.73	38.41	39.09
28	37.74	38.43	39.13	39.83	40.54
29	39.09	39.81	40.53	41.25	41.99
30	40.44	41.18	41.92	42.67	43.43
31	41.79	42.55	43.32	44.10	44.01

## A Table of Cylinders

	.2	.4	.6	.8
2	0.29	0.30	0.31	0.31
4	0.59	0.60	0.62	0.63
6	0.88	0.90	0.93	0.95
8	1.18	1.20	1.24	1.26
Area	1.47	1.50	1.55	1.58
2	2.95	3.00	3.05	3.15
3	4.42	4.50	4.57	4.73
4	5.89	6.00	6.10	6.31
5	7.37	7.49	7.62	7.89
6	8.84	8.99	9.15	9.46
7	10.31	10.49	10.67	11.04
8	11.79	11.99	12.20	12.62
9	13.26	13.49	13.72	14.20
10	14.73	14.99	15.25	15.78
11	16.21	16.49	16.77	17.35
12	17.68	17.99	18.30	18.93
13	19.15	19.49	19.82	20.51
14	20.63	20.99	21.35	22.09
15	22.10	22.48	22.87	23.66
16	23.57	23.98	24.40	25.24
17	25.05	25.48	25.92	26.82
18	26.52	26.98	27.45	28.40
19	27.99	28.48	28.97	29.97
20	29.47	29.98	30.50	31.55
21	30.94	31.48	32.02	33.13
22	32.41	32.98	33.55	34.71
23	33.88	34.48	35.07	36.28
24	35.36	35.98	36.60	37.86
25	36.83	37.47	38.12	39.44
26	38.30	38.97	39.65	41.02
27	39.78	40.47	41.17	42.59
28	41.25	41.97	42.70	44.17
29	42.72	43.47	44.22	45.75
30	44.20	44.97	45.75	47.33
31	45.67	46.47	47.27	48.90

	24	.2	.4	.6	.8
.2	0.32	0.33	0.33	0.34	0.34
.4	0.64	0.65	0.66	0.67	0.68
.6	0.96	0.98	0.99	1.01	1.03
.8	1.28	1.30	1.33	1.35	1.37
Area.	1.60	1.63	1.66	1.68	1.71
2	3.21	3.26	3.32	3.37	3.43
3	4.81	4.89	4.97	5.06	5.14
4	6.42	6.52	6.63	6.74	6.85
5	8.02	8.15	8.29	8.43	8.66
6	9.62	9.79	9.95	10.11	10.38
7	11.23	11.42	11.61	11.80	12.09
8	12.83	13.05	13.26	13.48	13.80
9	14.44	14.68	14.92	15.17	15.52
10	16.04	16.31	16.58	16.85	17.23
11	17.65	17.94	18.24	18.54	18.84
12	19.25	19.57	19.90	20.23	20.56
13	20.85	21.20	21.55	21.91	22.27
14	22.46	22.83	23.21	23.60	23.98
15	24.07	24.46	24.87	25.28	25.69
16	25.67	26.10	26.53	26.97	27.41
17	27.27	28.73	28.19	28.65	29.12
18	28.87	29.36	29.84	30.34	30.83
19	30.43	30.99	31.50	32.02	32.55
20	32.08	32.62	33.16	33.71	34.26
21	33.69	34.25	34.82	35.39	35.97
22	35.29	35.88	36.48	37.08	37.69
23	36.90	37.51	38.14	38.77	39.40
24	38.50	39.14	39.79	40.45	41.11
25	40.10	40.77	41.45	42.14	42.82
26	41.71	42.41	43.11	43.82	44.54
27	43.31	44.04	44.77	45.51	46.25
28	44.92	45.67	46.43	47.19	47.96
29	46.52	47.30	48.08	48.88	49.68
30	48.13	48.93	49.74	50.56	51.39
31	49.73	50.56	51.40	52.25	53.10



## A Table of Cylinders

		.2	.4	.6	.8
2	0.35	0.35	0.36	0.36	0.37
4	0.70	0.71	0.72	0.73	0.74
6	1.04	1.06	1.08	1.09	1.11
8	1.39	1.41	1.44	1.46	1.48
Area	1.74	1.77	1.80	1.82	1.85
2	3.48	3.54	3.59	3.65	3.71
3	5.22	5.30	5.39	5.47	5.56
4	6.96	7.07	7.19	7.30	7.41
5	8.70	8.84	8.98	9.13	9.27
6	10.44	10.61	10.78	10.95	11.12
7	12.18	12.38	12.58	12.78	12.98
8	13.92	14.15	14.37	14.60	14.83
9	15.67	15.92	16.17	16.43	16.68
10	17.41	17.69	17.97	18.25	18.54
11	19.15	19.45	19.76	20.08	20.39
12	20.89	21.22	21.56	21.90	22.24
13	22.63	22.99	23.36	23.73	24.10
14	24.37	24.76	25.15	25.55	25.95
15	26.11	26.53	26.95	27.38	27.81
16	27.85	28.31	28.75	29.20	29.66
17	29.59	30.08	30.54	31.03	31.51
18	31.33	31.84	32.34	32.85	33.37
19	33.07	33.60	34.14	34.68	35.22
20	34.81	35.37	35.94	36.50	37.08
21	36.55	37.14	37.72	38.33	38.93
22	38.29	38.91	39.53	40.15	40.78
23	40.04	40.68	41.33	41.98	42.64
24	41.78	42.47	43.12	43.80	44.49
25	43.52	44.21	44.92	45.63	46.34
26	45.26	45.98	46.72	47.45	48.20
27	47.00	47.77	48.51	49.28	50.05
28	48.74	49.52	50.31	51.10	51.91
29	50.48	51.29	52.11	52.93	53.76
30	52.22	53.06	53.90	54.76	55.61
31	53.06	54.82	55.70	56.58	57.47



	26	.2	.4	.6	8
.2	0.38	0.38	0.39	0.39	0.40
.4	0.75	0.76	0.78	0.79	0.80
.6	1.13	1.15	1.16	1.18	1.20
.8	1.51	1.53	1.55	1.58	1.60
Area	1.88	1.91	1.94	1.97	2.00
2	3.76	3.82	3.88	3.94	4.00
3	5.65	5.73	5.82	5.91	6.00
4	7.53	7.65	7.76	6.88	8.00
5	9.41	9.56	9.70	9.85	10.00
6	11.30	11.47	11.65	11.82	12.00
7	13.18	13.38	13.59	13.79	14.00
8	15.06	15.29	15.53	15.76	16.00
9	16.94	17.21	17.47	17.73	18.00
10	18.83	19.12	19.41	19.71	20.00
11	20.71	21.03	21.35	21.68	22.00
12	22.59	22.94	23.29	23.65	24.00
13	24.47	24.85	25.23	25.62	26.00
14	26.36	26.76	27.17	27.59	28.00
15	28.24	28.68	29.12	29.56	30.00
16	30.12	30.59	31.06	31.53	32.00
17	32.00	32.50	33.00	33.50	34.00
18	33.89	34.41	34.94	35.47	36.00
19	35.77	36.32	36.88	37.44	38.00
20	37.65	38.24	38.82	39.41	40.01
21	39.54	40.15	40.76	41.38	42.01
22	41.42	42.06	42.70	43.35	44.01
23	43.30	43.97	44.64	45.32	46.01
24	45.18	45.88	46.59	47.29	48.01
25	47.07	47.79	48.53	49.26	50.01
26	48.95	49.71	50.47	51.23	52.01
27	50.83	51.62	52.41	53.21	54.01
28	52.71	53.53	54.35	55.18	56.01
29	54.60	55.44	56.29	57.15	58.01
30	56.48	57.35	58.23	59.12	60.01
31	58.36	59.26	60.17	61.09	62.01

## A Table of Cylinders

	.2	.4	.6	.8
.2	0.41	0.81	1.22	1.62
.4	0.81	1.22	1.62	2.03
.6	1.22	1.62	2.03	2.44
.8	1.62	2.03	2.44	2.85
Area.	2.03	2.44	2.85	3.26
2	4.06	6.09	8.12	10.15
3	6.09	9.14	12.18	15.22
4	8.12	12.18	16.24	20.30
5	10.15	15.22	19.30	23.38
6	12.18	18.24	22.36	26.46
7	14.21	21.27	25.41	29.54
8	16.24	24.28	28.46	32.61
9	18.27	27.29	31.51	35.69
10	20.30	30.30	34.56	38.74
11	22.33	33.31	37.61	41.79
12	24.36	36.32	40.66	44.84
13	26.39	39.33	43.71	47.89
14	28.42	42.34	46.76	50.94
15	30.45	45.35	49.81	53.99
16	32.48	48.36	52.86	57.04
17	34.51	51.37	55.91	60.09
18	36.54	54.38	58.96	63.14
19	38.57	57.39	62.01	66.19
20	40.60	60.40	65.06	69.24
21	42.63	63.41	68.11	72.29
22	44.66	66.42	71.16	75.34
23	46.69	69.43	74.21	78.39
24	48.72	72.44	77.26	81.44
25	50.75	75.45	80.31	84.49
26	52.78	78.46	83.36	87.54
27	54.81	81.47	86.41	90.59
28	56.84	84.48	89.46	93.64
29	58.87	87.49	92.51	96.69
30	60.90	90.50	95.56	99.74
31	62.93	93.51	98.61	102.79

	.2	.4	.6	.8
.2	0.44	0.45	0.45	0.46
.4	0.87	0.90	0.91	0.92
.6	1.31	1.35	1.37	1.39
.8	1.75	1.80	1.82	1.85
Area	2.18	2.25	2.28	2.31
2	4.37	4.49	4.56	4.62
3	6.55	6.74	6.83	6.93
4	8.73	8.98	9.11	9.24
5	10.92	11.23	11.39	11.55
6	13.10	13.48	13.67	13.86
7	15.28	15.72	15.95	16.17
8	17.47	17.97	18.22	18.48
9	19.65	20.22	20.50	20.79
10	21.83	22.46	22.78	23.10
11	24.02	24.71	25.06	25.41
12	26.20	26.95	27.34	27.72
13	28.38	29.20	29.61	30.03
14	30.57	31.45	31.89	32.34
15	32.75	33.69	34.17	34.65
16	34.94	35.94	36.45	36.96
17	37.12	38.19	38.73	39.27
18	39.30	40.43	41.00	41.58
19	41.48	42.68	43.28	43.89
20	43.67	44.33	45.56	46.10
21	45.85	47.17	47.84	48.51
22	48.04	49.42	50.12	50.82
23	50.22	51.66	52.40	53.13
24	52.40	53.91	54.67	55.44
25	54.59	56.16	56.95	57.75
26	56.77	58.40	59.23	60.06
27	58.95	60.65	61.51	62.37
28	61.14	62.90	63.79	64.68
29	63.32	65.14	66.06	66.99
30	65.50	67.39	68.34	69.30
31	67.69	69.63	70.62	71.61

37  
15  
52



## A Table of Cylinders

	.2	.2	.4	.6	.8
.2	0.47	0.47	0.48	0.49	0.49
.4	0.94	0.95	0.69	0.98	0.99
.6	1.40	1.42	1.44	1.46	1.48
.8	1.87	1.90	1.92	1.95	1.98
Area.	2.34	2.37	2.41	2.44	2.47
2	4.68	4.75	4.81	4.88	4.95
3	7.03	7.12	7.22	7.32	7.42
4	9.37	9.50	9.63	9.76	9.89
5	11.71	11.87	12.04	12.20	12.37
6	14.05	14.25	14.44	14.64	14.84
7	16.40	16.62	16.85	17.08	17.31
8	18.74	19.00	19.26	19.52	19.79
9	21.08	21.37	21.66	21.96	22.26
10	23.42	23.75	24.07	24.40	24.73
11	25.76	26.12	26.48	26.84	27.21
12	28.11	28.50	28.89	29.28	29.68
13	30.45	30.87	31.29	31.72	32.15
14	32.79	33.24	33.70	34.16	34.63
15	35.13	35.62	36.11	36.60	37.10
16	37.48	37.99	38.52	39.04	39.57
17	39.82	40.37	40.92	41.48	42.05
18	42.16	42.74	43.33	43.92	44.52
19	44.50	45.12	45.74	46.36	46.99
20	46.85	47.49	48.15	48.80	49.47
21	49.19	49.87	50.55	51.24	51.94
22	51.53	52.24	52.96	53.68	54.41
23	53.87	54.62	55.37	56.12	56.88
24	56.21	56.99	57.77	58.56	59.36
25	58.56	59.37	60.18	61.00	61.83
26	60.90	61.74	62.59	63.44	64.30
27	63.24	64.12	65.00	65.88	66.78
28	65.58	66.49	67.40	68.32	69.25
29	67.93	68.87	69.81	70.76	71.72
30	70.27	71.24	72.22	73.21	74.20
31	72.61	73.61	74.63	75.65	76.67



# in Ale Gallons.

31

	30	.2	.4	.6	.8
.2	0.50	0.51	0.51	0.52	0.53
.4	1.00	1.02	1.03	1.04	1.06
.6	1.50	1.52	1.54	1.56	1.58
.8	2.00	2.03	2.06	2.09	2.11
Area.	2.51	2.54	2.57	2.61	2.64
2	5.01	5.08	5.15	5.21	5.28
3	7.52	7.62	7.72	7.82	7.93
4	10.03	10.16	10.29	10.43	10.57
5	12.53	12.70	12.87	13.04	13.21
6	15.04	15.24	15.44	15.65	15.85
7	17.55	17.78	18.02	18.25	18.49
8	20.05	20.32	20.59	20.86	21.14
9	22.56	22.86	23.16	23.47	23.78
10	25.07	25.40	25.74	26.08	26.42
11	27.57	27.94	28.31	28.68	29.06
12	30.08	30.48	30.88	31.29	31.70
13	32.58	33.02	33.46	33.90	34.35
14	35.09	35.56	36.03	36.51	36.99
15	37.60	38.10	38.61	39.12	39.63
16	40.10	40.64	41.18	41.72	42.27
17	42.61	43.18	43.75	44.33	44.91
18	45.12	45.72	46.33	46.94	47.56
19	47.62	48.26	48.90	49.55	50.20
20	50.13	50.80	51.48	52.16	52.84
21	52.64	53.34	54.05	54.76	55.48
22	55.14	55.88	56.62	57.37	58.12
23	57.65	58.42	59.20	59.98	60.77
24	60.16	60.96	61.77	62.59	63.41
25	62.66	63.50	64.34	65.19	66.05
26	65.17	66.04	66.92	67.80	68.69
27	67.68	68.58	69.50	70.41	71.33
28	70.18	71.12	72.07	73.02	73.98
29	72.69	73.66	74.64	75.63	76.62
30	75.20	76.20	77.21	78.23	79.26
31	77.70	78.74	79.79	80.84	81.90

## A Table of Cylinders

	31	.2	.4	.6	.8
.2	0.53	0.54	0.55	0.56	0.56
.4	1.07	1.08	1.10	1.11	1.13
.6	1.60	1.63	1.65	1.67	1.69
.8	2.14	2.17	2.20	2.22	2.25
Area	2.68	2.71	2.75	2.78	2.82
2	5.35	5.42	5.49	5.56	5.63
3	8.03	8.13	8.24	8.34	8.45
4	10.71	10.84	10.98	11.12	11.26
5	13.38	13.56	13.73	13.90	14.08
6	16.06	16.27	16.48	16.69	16.90
7	18.73	18.98	19.22	19.47	19.71
8	21.41	21.69	21.97	22.25	22.53
9	24.09	24.40	24.71	25.03	25.35
10	26.76	27.11	27.46	27.81	28.16
11	29.44	29.82	30.21	30.59	30.98
12	32.12	32.53	32.95	33.37	33.80
13	34.79	35.24	35.70	36.15	36.61
14	37.47	37.96	38.44	38.93	39.43
15	40.15	40.67	41.19	41.72	42.25
16	42.82	43.38	43.94	44.50	45.06
17	45.50	46.09	46.68	47.28	47.88
18	48.18	48.80	49.43	50.06	50.69
19	50.85	51.51	52.17	52.84	53.51
20	53.53	54.22	54.92	55.62	56.33
21	56.21	56.93	57.67	58.40	59.14
22	58.88	59.65	60.41	61.18	61.96
23	61.56	62.36	63.16	63.96	64.78
24	64.24	65.07	65.91	66.75	67.59
25	66.91	67.78	68.65	69.53	70.41
26	69.59	70.49	71.40	72.31	73.23
27	72.26	73.20	74.14	75.09	76.04
28	74.94	75.91	76.89	77.87	78.86
29	77.62	78.62	79.64	80.65	81.67
30	80.29	81.34	82.38	83.43	84.49
31	82.97	84.05	85.13	86.21	87.31

	32	.2	.4	.6	.8
.2	0.57	0.58	0.58	0.59	0.60
.4	1.14	1.15	1.17	1.18	1.20
.6	1.71	1.73	1.75	1.78	1.80
.8	2.28	2.31	2.34	2.37	2.40
Area.	2.85	2.89	2.92	2.96	3.00
2	5.70	5.77	5.85	5.92	5.99
3	8.55	8.66	8.77	8.88	8.99
4	11.41	11.55	11.69	11.84	11.98
5	14.26	14.44	14.62	14.80	14.98
6	17.11	17.32	17.54	17.76	17.98
7	19.96	20.21	20.46	20.72	20.97
8	22.81	23.10	23.39	23.68	23.97
9	25.67	25.99	26.31	26.64	26.97
10	28.52	28.88	29.24	29.60	29.96
11	31.37	31.77	32.16	32.56	32.96
12	34.22	34.65	35.08	35.52	35.96
13	37.07	37.54	38.01	38.48	38.95
14	39.93	40.43	40.93	41.44	41.95
15	42.78	43.31	43.85	44.40	44.95
16	45.63	46.20	46.78	47.36	47.94
17	48.48	49.09	49.70	50.32	50.94
18	51.33	51.98	52.62	53.28	53.93
19	54.19	54.86	55.55	56.24	56.93
20	57.04	57.75	58.47	59.20	59.93
21	59.89	60.64	61.39	62.16	62.92
22	62.74	63.53	64.32	65.12	65.92
23	65.59	66.41	67.24	68.08	68.92
24	68.44	69.30	70.17	71.04	71.91
25	71.30	72.19	73.09	74.00	74.91
26	74.15	75.08	76.01	76.96	77.91
27	77.00	77.96	78.94	79.92	80.90
28	79.85	80.85	81.86	82.88	83.90
29	82.70	83.74	84.78	85.84	86.89
30	85.56	86.63	87.71	88.80	89.89
31	88.41	89.51	90.63	91.76	92.89



## A Table of Cylinders

	.33	.2	.4	.6	.8
.3	0.61	0.61	0.62	0.63	0.64
.4	1.21	1.23	1.24	1.26	1.27
.6	1.82	1.84	1.86	1.89	1.91
.8	2.43	2.45	2.48	2.51	2.54
Area	3.03	3.07	3.11	3.14	3.18
2	6.07	6.14	6.21	6.29	6.36
3	9.10	9.21	9.32	9.43	9.54
4	12.13	12.28	12.43	12.58	12.73
5	15.16	15.35	15.53	15.72	15.91
6	18.20	18.40	18.64	18.86	19.09
7	21.23	21.49	21.75	22.01	22.27
8	24.26	24.56	24.85	25.15	25.45
9	27.30	27.63	27.96	28.30	28.64
10	30.33	30.70	31.07	31.44	31.82
11	33.36	33.77	34.17	34.59	35.00
12	36.40	36.84	37.28	37.73	38.18
13	39.43	39.91	40.39	40.87	41.36
14	42.46	42.93	43.50	44.02	44.54
15	45.49	46.05	46.60	47.16	47.73
16	48.53	49.12	49.71	50.31	50.91
17	51.56	52.19	52.82	53.45	54.09
18	54.59	55.26	55.92	56.60	57.27
19	57.63	58.33	59.03	59.74	60.45
20	60.66	61.40	62.14	62.89	63.64
21	63.69	64.46	65.24	66.03	66.82
22	66.73	67.53	68.35	69.17	70.00
23	69.76	70.60	71.46	72.32	73.18
24	72.79	73.67	74.56	75.46	76.36
25	75.82	76.74	77.67	78.61	79.54
26	78.86	79.81	80.78	81.75	82.73
27	81.89	82.88	83.89	84.90	85.91
28	84.92	85.95	86.99	88.04	89.09
29	87.96	89.02	90.10	91.18	92.27
30	90.99	92.09	93.21	94.33	95.45
31	94.02	95.16	96.31	97.47	98.63



	34	.2	.4	.6	.8
.2	0.64	0.65	0.66	0.67	0.67
.4	1.29	1.30	1.32	1.33	1.35
.6	1.93	1.95	1.98	2.00	2.02
.8	2.57	2.61	2.64	2.67	2.70
Area.	3.22	3.26	3.29	3.33	3.37
2	6.44	6.51	6.59	6.67	6.74
3	9.66	9.77	9.89	10.00	10.12
4	12.88	13.03	13.18	13.34	13.49
5	16.10	16.39	16.48	16.67	16.86
6	19.32	19.64	19.78	20.00	20.24
7	22.54	22.80	23.97	23.34	23.61
8	25.76	26.06	26.36	26.67	26.98
9	28.98	29.32	29.66	30.01	30.35
10	32.20	32.58	32.96	33.34	33.73
11	35.41	35.83	36.25	36.68	37.10
12	38.63	39.09	39.55	40.01	40.47
13	41.85	42.35	42.84	43.34	43.85
14	45.07	45.61	46.14	46.68	47.22
15	48.29	48.86	49.41	50.01	50.59
16	51.51	52.12	52.73	53.35	53.96
17	54.73	55.38	56.03	56.68	57.34
18	57.95	58.64	59.32	60.01	60.71
19	61.17	61.89	62.62	63.35	64.08
20	64.39	65.15	65.92	66.68	67.46
21	67.61	68.41	69.21	70.02	70.83
22	70.83	71.67	72.51	73.35	74.20
23	74.05	74.92	75.80	76.69	77.57
24	77.27	78.18	79.10	80.02	80.95
25	80.49	81.44	82.39	83.35	84.32
26	83.71	84.70	85.69	86.69	87.69
27	86.93	87.95	88.99	90.02	91.07
28	90.15	91.21	92.28	93.36	94.44
29	93.37	94.47	95.58	96.69	97.81
30	96.59	97.73	98.87	100.02	101.18
31	99.81	100.98	102.17	103.36	104.56

## A Table of Cylinders

	35	.2	.4	.6	.8
.2	0.68	0.69	0.70	0.70	0.71
.4	1.36	1.38	1.40	1.41	1.43
.6	2.05	2.07	2.09	2.12	2.14
.8	2.73	2.76	2.79	2.82	2.85
Area.	3.41	3.45	3.49	3.53	3.57
2	6.82	6.90	6.98	7.06	7.14
3	10.23	10.35	10.47	10.59	10.71
4	13.65	13.80	13.96	14.12	14.28
5	17.06	17.25	17.45	17.65	17.85
6	20.47	20.70	20.94	21.18	21.42
7	23.88	24.15	24.43	24.71	24.99
8	27.29	27.61	27.92	28.24	28.56
9	30.70	31.06	31.41	31.77	32.12
10	34.12	34.51	34.90	35.30	35.69
11	37.53	37.96	38.39	38.83	39.26
12	40.94	41.41	41.88	42.36	42.83
13	44.35	44.86	45.37	45.89	46.40
14	47.76	48.31	48.86	49.41	49.97
15	51.17	51.76	52.35	52.94	53.54
16	54.59	55.21	55.84	56.42	57.11
17	58.00	58.66	59.33	60.00	60.68
18	61.41	62.11	62.82	63.53	64.25
19	64.82	65.56	66.31	67.06	67.82
20	68.23	69.02	69.80	70.59	71.39
21	71.64	72.47	73.29	74.12	74.96
22	75.06	75.92	76.78	77.65	78.53
23	78.47	79.37	80.27	81.18	82.10
24	81.88	82.82	83.76	84.71	85.67
25	85.29	86.27	87.25	88.24	89.24
26	88.70	89.72	90.94	91.77	92.81
27	92.11	93.17	94.23	95.30	96.38
28	95.53	96.62	96.72	98.83	99.95
29	98.94	100.07	101.21	102.36	103.51
30	102.35	103.52	104.70	105.89	107.08
31	105.76	106.97	108.19	109.82	110.65

	36	.2	.4	.6	.8
.2	0.72	0.73	0.74	0.75	0.79
.4	1.44	1.46	1.48	1.49	1.51
.6	2.16	2.19	2.21	2.24	2.26
.8	2.89	2.92	2.95	2.98	3.02
Area.	3.61	3.65	3.69	3.73	3.77
2	7.22	7.30	7.38	7.46	7.54
3	10.83	10.95	11.07	11.19	11.31
4	14.44	14.60	14.76	14.92	15.09
5	18.05	18.25	18.45	18.65	18.86
6	21.66	21.90	22.14	22.38	22.63
7	25.27	25.55	25.83	26.11	26.40
8	28.88	29.20	29.52	29.84	30.17
9	32.48	32.85	33.21	33.58	33.94
10	36.09	36.50	36.90	37.31	37.72
11	39.70	40.15	40.59	41.04	41.49
12	43.31	43.80	44.28	44.77	45.26
13	46.92	47.45	47.97	48.50	49.03
14	50.53	51.09	51.66	52.23	52.80
15	54.14	54.74	55.35	55.96	56.57
16	57.75	58.39	59.04	59.69	60.34
17	61.36	62.04	62.73	63.42	64.12
18	64.97	65.69	66.42	67.15	67.89
19	68.58	69.34	70.11	70.88	71.66
20	72.19	72.99	73.80	74.61	75.43
21	75.80	76.64	77.49	78.34	79.20
22	79.41	80.29	81.18	82.07	82.97
23	83.02	83.94	84.87	85.81	86.75
24	86.63	87.59	88.56	89.54	90.52
25	90.24	91.24	92.25	93.27	94.29
26	93.85	94.89	95.94	97.00	98.06
27	97.46	98.54	99.63	100.73	101.83
28	101.07	102.19	103.32	104.46	105.60
29	104.67	105.84	107.01	108.19	109.38
30	108.28	109.49	110.70	111.92	113.15
31	111.89	113.14	114.39	115.65	116.92



	37	.2	.4	.6	.8
.2	0.76	0.77	0.78	0.79	0.79
.4	1.52	1.54	1.56	1.57	1.59
.6	2.29	2.31	2.34	2.36	2.39
.8	3.05	3.08	3.12	3.15	3.18
Area.	3.81	3.85	3.89	3.94	3.98
2	7.62	7.71	7.79	7.87	7.96
3	11.44	11.56	11.69	11.81	11.94
4	15.25	15.42	15.58	15.75	15.92
5	19.06	19.27	19.48	19.69	19.90
6	22.88	23.12	23.37	23.62	23.88
7	26.69	26.98	27.27	27.56	27.85
8	30.50	30.83	31.16	31.50	31.83
9	34.31	34.69	35.06	35.44	35.81
10	38.13	38.54	38.96	39.37	39.79
11	41.94	42.40	42.85	43.31	43.77
12	45.75	46.25	46.75	47.25	47.75
13	49.57	50.10	50.64	51.19	51.73
14	53.38	53.96	54.54	55.12	55.71
15	57.19	57.81	58.43	59.06	59.69
16	61.00	61.67	62.33	63.00	63.67
17	64.82	65.52	66.23	66.93	67.65
18	68.63	69.37	70.12	70.87	71.63
19	72.44	73.23	74.02	74.81	75.61
20	76.26	77.08	77.91	78.75	79.59
21	80.07	80.94	81.81	82.68	83.57
22	83.88	84.79	85.71	86.62	87.55
23	87.69	88.65	89.60	90.56	91.53
24	91.51	92.50	93.50	94.50	95.50
25	95.32	96.35	97.39	98.43	99.48
26	99.13	100.21	101.29	102.37	103.46
27	102.94	104.06	105.18	106.31	107.44
28	106.76	107.92	109.08	110.24	111.42
29	110.57	111.77	112.97	114.18	115.40
30	114.38	115.63	116.87	118.12	119.38
31	118.20	119.48	120.77	122.06	123.36



	38	.2	.4	.6	.8
.2	0.80	0.81	0.82	0.83	0.84
.4	1.61	1.62	1.64	1.66	1.68
.6	2.41	2.44	2.46	2.49	2.51
.8	3.22	3.25	3.28	3.32	3.35
Area.	4.02	4.06	4.11	4.15	4.19
2	8.04	8.13	8.21	8.30	8.38
3	12.06	12.19	12.32	12.45	12.58
4	16.09	16.26	16.43	16.60	16.77
5	20.11	20.32	20.53	20.75	20.96
6	24.13	24.38	24.64	24.90	25.16
7	28.15	28.45	28.75	29.05	29.35
8	32.17	32.51	32.85	33.20	33.54
9	36.19	36.58	36.96	37.35	37.73
10	40.22	40.64	41.07	41.50	41.93
11	44.24	44.71	45.17	45.64	46.12
12	48.26	48.77	49.28	49.79	50.31
13	52.28	52.83	53.39	53.94	54.50
14	56.30	56.90	57.49	58.09	58.70
15	60.32	61.96	61.60	62.24	62.89
16	64.35	65.03	65.71	66.39	67.08
17	68.37	69.09	69.81	70.54	71.27
18	72.39	73.15	73.92	74.69	75.47
19	76.41	77.22	78.03	78.84	79.66
20	80.43	81.28	82.14	82.99	83.85
21	84.45	85.35	86.24	87.14	88.05
22	88.48	89.41	90.35	91.24	92.24
23	92.50	93.48	94.46	95.44	96.43
24	96.52	97.54	98.56	99.59	100.62
25	100.54	101.60	102.67	103.74	104.82
26	104.56	105.67	106.78	107.89	109.01
27	108.58	109.73	110.88	112.04	113.20
28	112.61	113.80	114.99	116.19	117.39
29	116.63	117.86	119.10	120.34	121.59
30	120.65	121.93	123.20	124.49	125.78
31	124.67	125.99	127.31	128.64	129.97

## A Table of Cylinders

	39	.2	.4	.6	.8
.2	0.85	0.85	0.86	0.87	0.88
.4	1.69	1.71	1.73	1.75	1.76
.6	2.54	2.57	2.59	2.62	2.65
.8	3.39	3.42	3.46	3.49	3.53
Area.	4.24	4.28	4.32	4.37	4.41
2	8.47	8.56	8.65	8.74	8.82
3	12.71	12.84	12.97	13.10	13.23
4	16.94	17.12	17.29	17.47	17.65
5	21.18	21.40	21.62	21.84	22.06
6	25.42	25.68	25.94	26.20	26.47
7	29.65	29.96	30.27	30.57	30.88
8	33.89	34.24	34.59	34.94	35.29
9	38.12	38.52	38.91	39.31	39.70
10	42.36	42.80	43.23	43.67	44.12
11	46.60	47.08	47.56	48.04	48.53
12	50.83	51.36	51.88	52.41	52.94
13	55.67	55.64	56.20	56.78	57.35
14	59.30	59.91	60.53	61.14	61.76
15	63.54	64.19	64.85	65.51	66.17
16	67.78	68.47	69.18	69.88	70.59
17	72.01	72.75	73.50	74.25	75.00
18	76.25	77.03	77.82	78.61	79.41
19	80.49	81.31	82.15	82.98	83.82
20	84.72	85.59	86.47	87.35	88.23
21	88.96	89.87	90.79	91.72	92.64
22	93.19	94.15	95.12	96.08	97.06
23	97.43	98.43	99.44	100.45	101.47
24	101.66	102.71	103.76	104.82	105.88
25	105.90	106.99	108.09	109.19	110.29
26	110.14	111.27	112.41	113.55	114.70
27	114.37	115.55	116.73	117.92	119.11
28	118.51	119.83	121.06	122.29	123.53
29	122.85	124.11	125.38	126.66	127.94
30	127.08	128.39	129.70	131.02	132.35
31	131.32	132.67	134.03	135.39	136.76

in Ale Gallons.

41

	40	.2	.4	.6	.8
.2	0.89	0.90	0.91	0.92	0.93
.4	1.78	1.80	1.82	1.84	1.85
.6	2.67	2.70	2.73	2.75	2.78
.8	3.56	3.60	3.64	3.67	3.71
Area.	4.46	4.50	4.54	4.59	4.64
2	8.91	9.00	9.09	9.18	9.27
3	13.37	13.50	13.64	13.77	13.91
4	17.82	18.00	18.18	18.36	18.54
5	22.28	22.50	22.73	22.95	23.18
6	26.74	27.00	27.27	27.54	27.82
7	31.19	31.51	31.82	32.14	32.45
8	35.65	36.01	36.37	36.73	37.09
9	40.11	40.51	40.91	41.32	41.72
10	44.56	45.01	45.46	45.91	46.36
11	49.02	49.51	50.00	50.50	51.00
12	53.47	54.01	54.55	55.09	55.63
13	57.93	58.51	59.09	59.68	60.27
14	62.39	63.01	63.64	64.27	64.91
15	66.84	67.51	68.19	68.86	69.54
16	71.30	72.01	72.73	73.45	74.18
17	75.75	76.51	77.28	78.04	78.81
18	80.21	81.02	81.82	82.64	83.45
19	84.67	85.52	86.37	87.23	88.09
20	89.12	90.02	90.92	91.82	92.72
21	93.58	94.52	95.56	96.41	97.36
22	98.04	99.02	100.11	101.00	102.00
23	102.49	103.52	104.65	105.59	106.63
24	106.95	108.02	109.20	110.18	111.27
25	111.40	112.52	113.74	114.77	115.90
26	115.86	117.02	118.29	119.36	120.54
27	120.32	121.52	122.84	123.95	125.18
28	124.77	126.02	127.28	128.54	129.81
29	129.23	130.53	131.83	133.14	135.45
30	133.69	135.03	136.37	137.73	139.09
31	148.14	139.53	140.92	142.32	141.72



## A Table of Cylinders

	.4	.2	.4	.6	.8
.2	0.94	0.94	0.95	0.96	0.97
.4	1.87	1.89	1.91	1.93	1.95
.6	2.81	2.84	2.86	2.89	2.92
.8	3.74	3.78	3.82	3.85	3.89
Area.	4.68	4.73	4.77	4.82	4.87
2	9.36	9.45	9.55	9.64	9.73
3	14.04	14.18	14.32	14.46	14.60
4	18.73	18.91	19.09	19.28	19.46
5	23.41	23.64	23.87	24.10	24.33
6	28.09	28.36	28.64	28.92	29.20
7	32.77	33.09	33.41	33.74	34.06
8	37.45	37.82	38.19	38.56	38.93
9	42.14	42.55	42.96	43.38	43.79
10	46.82	47.28	47.74	48.20	48.66
11	51.50	52.00	52.51	53.02	53.53
12	56.18	56.73	57.28	57.84	58.39
13	60.86	61.46	62.06	62.66	63.26
14	65.54	66.19	66.83	67.47	68.13
15	70.23	70.91	71.60	72.29	72.99
16	74.91	75.64	76.38	77.11	77.86
17	79.59	80.37	81.15	81.93	82.72
18	84.27	85.10	85.92	86.75	87.59
19	88.95	89.82	90.70	91.57	92.46
20	93.64	94.55	95.47	96.39	97.32
21	98.32	99.28	100.24	101.21	102.19
22	103.00	104.01	105.02	106.03	107.06
23	107.68	108.73	109.79	110.85	111.92
24	112.36	113.46	114.57	115.67	116.79
25	117.04	118.19	119.34	120.49	121.65
26	121.73	122.92	124.11	125.31	126.52
27	126.41	127.64	128.89	130.13	131.39
28	131.09	132.37	133.66	134.95	136.25
29	135.77	137.10	138.43	139.77	141.12
30	140.45	141.83	143.21	144.59	145.99
31	145.13	146.56	147.98	149.41	150.85



	.2	.2	.4	.6	.8
.2	0.98	0.99	1.00	1.01	1.02
.4	1.96	1.98	2.00	2.02	2.04
.6	2.95	2.97	3.00	3.03	3.06
.8	3.93	3.97	4.00	4.04	4.08
Area.	4.91	4.96	5.01	5.05	5.10
2	9.82	9.92	10.01	10.11	10.20
3	14.74	14.88	15.02	15.16	15.30
4	19.65	19.84	20.03	20.22	20.41
5	24.56	24.80	25.03	25.27	25.51
6	29.48	29.76	30.04	30.32	30.61
7	34.39	34.72	35.05	35.38	35.71
8	39.30	39.68	40.05	40.43	40.81
9	44.22	44.64	45.06	45.49	45.92
10	49.13	49.60	50.07	50.54	51.02
11	54.04	54.56	55.07	55.60	56.12
12	58.95	59.52	60.08	60.65	61.22
13	63.87	64.48	65.09	65.70	66.32
14	68.78	69.44	70.10	70.76	71.43
15	73.69	74.40	75.10	75.81	76.53
16	78.61	79.36	80.11	80.87	81.63
17	83.52	84.32	85.12	85.92	86.73
18	88.43	89.28	90.12	90.98	91.83
19	93.34	94.24	95.13	96.03	96.94
20	98.26	99.20	100.14	101.09	102.04
21	103.17	104.15	105.14	106.14	107.14
22	108.08	109.11	110.15	111.19	112.24
23	113.00	114.07	115.16	116.25	117.34
24	117.91	119.03	120.16	121.30	122.44
25	122.82	123.99	125.17	126.36	127.55
26	127.73	128.95	130.18	131.41	132.65
27	132.65	133.91	135.19	136.47	137.75
28	137.56	138.87	140.19	141.52	142.85
29	142.47	143.83	145.20	146.57	147.95
30	147.39	148.79	150.21	151.63	153.06
31	152.30	153.75	155.21	156.68	158.16

## A Table of Cylinders

	43	.2	.4	.6	.8
.2	1.03	1.04	1.05	1.06	1.07
.4	2.06	2.08	2.10	2.12	2.14
.6	3.09	3.12	3.15	3.18	3.20
.8	4.12	4.16	4.20	4.23	4.27
Area.	5.15	5.20	5.24	5.29	5.34
2	10.30	10.39	10.49	10.58	10.69
3	15.45	15.59	15.74	15.88	16.03
4	20.60	20.79	20.98	21.18	21.37
5	25.75	25.99	26.23	26.47	26.71
6	30.90	31.19	31.47	31.76	32.06
7	36.05	36.38	36.72	37.06	37.40
8	41.20	41.58	41.97	42.35	42.74
9	46.35	46.78	47.21	47.65	48.09
10	51.50	51.98	52.46	52.94	53.43
11	56.65	57.17	57.70	58.24	58.77
12	61.80	62.37	62.95	63.53	64.12
13	66.95	67.57	68.20	68.82	69.46
14	72.09	72.77	73.44	74.12	74.80
15	77.24	77.96	78.69	79.41	80.14
16	82.39	83.16	83.94	84.71	85.49
17	87.54	88.36	89.18	90.00	90.83
18	92.69	93.56	94.43	95.30	96.17
19	97.84	98.76	99.67	100.59	101.52
20	102.99	103.95	104.92	105.89	106.86
21	108.14	109.15	110.16	111.18	112.20
22	113.29	114.35	115.41	116.47	117.55
23	118.44	119.55	120.65	121.77	122.89
24	123.59	124.74	125.90	127.06	128.23
25	128.74	129.94	131.15	132.36	133.57
26	133.89	135.14	136.39	137.65	138.92
27	139.04	140.34	141.64	142.95	144.26
28	144.19	145.53	146.88	148.24	149.60
29	149.34	150.73	152.13	153.53	154.95
30	154.49	155.93	157.38	158.83	160.29
31	159.64	161.13	162.62	164.12	165.63

	44	.2	.4	.6	.8
.2	1.08	1.09	1.10	1.10	1.12
.4	2.16	2.18	2.20	2.22	2.23
.6	3.23	3.26	3.29	3.32	3.35
.8	4.31	4.35	4.39	4.43	4.47
Area.	5.39	5.44	5.49	5.54	5.59
2	10.78	10.88	10.98	11.03	11.18
3	16.18	16.32	16.47	16.62	16.77
4	21.57	21.76	21.96	22.16	22.36
5	26.96	27.21	27.45	27.70	27.95
6	32.35	32.65	32.94	33.24	33.54
7	37.74	38.09	38.43	38.78	39.13
8	43.14	43.53	43.92	44.32	44.72
9	48.53	48.97	49.41	49.86	50.31
10	53.92	54.41	54.90	55.40	55.90
11	59.31	59.85	60.39	60.94	61.49
12	64.70	65.29	65.89	66.48	67.08
13	70.10	70.73	71.38	72.02	72.67
14	75.49	76.18	76.87	77.56	78.25
15	80.88	81.62	82.36	83.10	83.84
16	86.27	87.06	87.85	88.64	89.43
17	91.66	92.50	93.34	94.18	95.02
18	97.06	97.94	98.83	99.72	100.61
19	102.45	103.38	104.32	105.26	106.20
20	107.84	108.82	109.81	110.80	111.79
21	113.23	114.26	115.30	116.34	117.38
22	118.62	119.71	120.79	121.88	122.97
23	124.02	125.15	126.28	127.42	128.56
24	129.41	130.59	131.77	132.96	134.15
25	134.80	136.03	137.26	138.50	139.74
26	140.19	141.47	142.75	144.04	145.33
27	145.58	146.91	148.24	149.58	150.92
28	150.98	152.35	153.73	155.12	156.51
29	156.37	157.79	159.22	160.66	162.10
30	161.76	163.24	164.71	166.20	167.70
31	167.15	168.68	170.20	171.74	173.28



## A Table of Cylinders

	45	.2	.4	.6	.8
.2	1.13	1.14	1.15	1.16	1.17
.4	2.25	2.28	2.30	2.32	2.34
.6	3.38	3.41	3.44	3.47	3.50
.8	4.51	4.55	4.59	4.63	4.67
Area	5.64	5.69	5.74	5.79	5.84
2	11.28	11.38	11.48	11.58	11.68
3	16.92	17.07	17.22	17.37	17.53
4	22.56	22.76	22.96	23.16	23.37
5	28.20	28.45	28.70	28.96	29.21
6	33.84	34.14	34.44	34.75	35.05
7	39.48	39.83	40.18	40.54	40.89
8	45.12	45.52	45.92	46.33	46.74
9	50.76	51.21	51.66	52.12	52.58
10	56.40	56.90	57.41	57.91	58.42
11	62.04	62.59	63.13	63.70	64.26
12	67.68	68.28	68.89	69.49	70.11
13	73.32	73.97	74.63	75.29	75.95
14	78.96	79.66	80.37	81.08	81.79
15	84.60	85.35	86.11	86.87	87.63
16	90.24	91.04	91.85	92.67	93.47
17	95.88	96.73	97.59	98.45	99.32
18	101.52	102.42	103.33	104.24	105.16
19	107.16	108.11	109.07	110.03	111.00
20	112.80	113.80	114.81	115.83	116.84
21	118.43	119.49	120.55	121.62	122.69
22	124.07	125.18	126.29	127.41	128.53
23	129.71	130.87	132.03	133.20	134.37
24	135.35	136.56	137.77	138.99	140.21
25	140.99	142.25	143.51	144.78	146.05
26	146.63	147.94	149.25	150.57	151.90
27	152.27	153.63	155.00	156.36	157.74
28	157.91	159.32	160.74	162.16	163.58
29	163.55	165.01	166.48	167.95	169.42
30	169.19	170.70	172.22	173.74	175.27
31	174.83	176.39	177.96	179.53	181.11



	46	.2	.4	.6	.8
.2	1.18	1.19	1.20	1.21	1.22
.4	2.36	2.38	2.40	2.42	2.44
.6	3.54	3.57	3.60	3.63	3.66
.8	4.71	4.75	4.80	4.84	4.88
<i>Aren.</i>	5.89	5.94	6.00	6.05	6.10
2	11.79	11.89	11.99	12.10	12.20
3	17.68	17.83	17.99	18.14	18.30
4	23.57	23.78	23.98	24.19	24.40
5	29.47	29.72	29.98	30.24	30.50
6	35.36	35.67	35.98	36.29	36.60
7	41.25	41.61	41.97	42.34	42.70
8	47.15	47.56	47.97	48.38	48.80
9	53.04	53.50	53.96	54.43	54.90
10	58.93	59.45	59.96	60.48	61.00
11	64.83	65.39	65.96	66.53	67.10
12	70.72	71.33	71.95	72.58	73.20
13	76.61	77.28	77.95	78.62	79.30
14	82.51	83.22	83.95	84.67	85.40
15	88.40	89.17	89.94	90.72	91.50
16	94.29	95.11	95.94	96.77	97.60
17	100.19	101.06	101.93	102.82	103.70
18	106.08	107.00	107.93	108.86	109.80
19	111.97	112.95	113.93	114.91	115.90
20	117.87	118.89	119.92	120.96	122.00
21	123.76	124.84	125.92	127.01	128.10
22	129.65	130.78	131.92	133.06	134.20
23	135.54	136.72	137.91	139.10	140.30
24	141.44	142.67	143.91	145.15	146.40
25	147.33	148.61	149.90	151.20	152.50
26	153.22	154.56	155.90	157.25	158.60
27	159.12	160.50	161.90	163.30	164.70
28	165.01	166.45	167.89	169.34	170.80
29	170.90	172.39	173.89	175.39	176.90
30	176.80	178.34	179.89	181.44	183.00
31	182.69	184.28	185.88	187.47	189.10

## A Table of Cylinders

	47	.2	.4	.6	.8
.2	1.23	1.24	1.25	1.26	1.27
.4	2.46	2.48	2.50	2.52	2.54
.6	3.69	3.72	3.75	3.79	3.82
.8	4.92	4.96	5.01	5.05	5.09
Area.	6.15	6.20	6.26	6.31	6.36
2	12.30	12.41	12.51	12.62	12.73
3	18.46	18.61	18.77	18.93	19.09
4	24.61	24.82	25.03	25.24	25.45
5	30.76	31.02	31.29	31.55	31.82
6	36.91	37.23	37.54	37.86	38.18
7	43.07	43.43	43.80	44.17	44.54
8	49.22	49.64	50.06	50.48	50.91
9	55.37	55.84	56.32	56.79	57.27
10	61.52	62.05	62.57	63.10	63.63
11	67.67	68.25	68.83	69.41	70.00
12	73.83	74.46	75.09	75.72	76.36
13	79.98	80.66	81.35	82.03	82.72
14	86.13	86.87	87.60	88.34	89.09
15	92.28	93.07	93.86	94.66	95.45
16	98.44	99.28	100.12	100.97	101.82
17	104.59	105.48	106.38	107.28	108.18
18	110.74	111.69	112.63	113.59	114.54
19	116.89	117.89	118.89	119.90	120.91
20	123.05	124.10	125.15	126.21	127.27
21	129.20	130.30	131.41	132.52	133.63
22	135.35	136.50	137.66	138.83	140.00
23	141.50	142.71	143.92	145.14	146.36
24	147.65	148.91	150.18	151.45	152.72
25	153.81	155.12	156.44	157.76	159.09
26	159.96	161.32	162.69	164.07	165.45
27	166.11	167.53	168.95	170.38	171.81
28	172.26	173.73	175.21	176.69	178.18
29	178.42	179.94	181.47	183.00	184.54
30	184.57	186.14	187.72	189.31	190.90
31	190.72	192.35	193.98	195.62	197.27

	48	.2	.4	.6	.8
.2	1.28	1.29	1.30	1.31	1.33
.4	2.57	2.59	2.61	2.63	2.65
.6	3.85	3.88	3.91	3.95	3.98
.8	5.13	5.18	5.22	5.26	5.31
Area.	6.42	6.47	6.52	6.58	6.63
2	12.83	12.94	13.05	13.16	13.26
3	19.25	19.41	19.57	19.73	19.90
4	25.67	25.88	26.10	26.31	26.53
5	32.08	32.35	32.62	32.89	33.16
6	38.50	38.82	39.14	39.47	39.79
7	44.92	45.29	45.67	46.05	46.43
8	51.33	51.76	52.19	52.63	53.06
9	57.75	58.23	58.72	59.20	59.69
10	64.17	64.70	65.24	65.78	66.33
11	70.59	71.17	71.77	72.36	72.96
12	77.00	77.65	78.29	78.94	79.59
13	83.42	84.12	84.82	85.52	86.22
14	89.84	90.59	91.34	92.10	92.85
15	96.25	97.06	97.86	98.67	99.49
16	102.67	103.53	104.29	105.25	106.12
17	109.09	110.00	110.91	111.83	112.75
18	115.50	116.47	117.44	118.41	119.38
19	121.92	122.94	123.96	124.99	126.02
20	128.34	129.41	130.49	131.57	132.65
21	134.75	135.88	137.01	138.14	139.28
22	141.17	142.35	143.54	144.72	145.91
23	147.59	148.82	150.06	151.30	152.55
24	154.00	155.29	156.58	157.88	159.18
25	160.42	161.76	163.11	164.46	165.81
26	166.84	168.23	169.63	171.04	172.45
27	173.25	174.70	176.16	177.61	179.08
28	179.67	181.17	182.68	184.19	185.71
29	186.09	187.64	189.20	190.77	192.34
30	192.51	194.12	195.73	197.35	198.98
31	198.92	200.58	202.25	203.93	205.61



## A Table of Cylinders

	.49	.2	.4	.6	.8
.2	1.34	1.35	1.36	1.37	1.38
.4	2.67	2.70	2.72	2.74	2.76
.6	4.01	4.04	4.08	4.11	4.14
.8	5.55	5.39	5.44	5.48	5.52
Area.	6.69	6.74	6.80	6.85	6.91
2	13.37	13.48	13.59	13.70	13.81
3	20.06	20.23	20.39	20.55	20.72
4	26.75	26.97	27.19	27.41	27.63
5	33.44	33.71	33.98	34.26	34.54
6	40.12	40.45	40.78	41.11	41.44
7	46.81	47.19	47.58	47.96	48.35
8	53.49	53.93	54.37	54.81	55.26
9	60.18	60.67	61.17	61.67	62.16
10	66.87	67.42	67.97	68.52	69.07
11	73.56	74.16	74.76	75.37	75.98
12	80.24	80.90	81.56	82.22	82.89
13	86.93	87.64	88.35	89.07	89.79
14	93.62	94.38	95.15	95.93	96.70
15	100.30	101.13	101.95	102.78	103.61
16	106.99	107.87	108.74	109.63	110.52
17	113.68	114.61	115.54	116.48	117.42
18	120.37	121.35	122.34	123.33	124.33
19	127.05	128.09	129.14	130.18	131.24
20	133.74	134.83	135.93	137.04	138.14
21	140.43	141.57	142.73	143.89	145.05
22	147.12	148.32	149.53	150.74	151.96
23	153.80	155.06	156.32	157.59	158.86
24	160.49	161.80	163.12	164.44	165.77
25	167.17	168.54	169.92	171.29	172.68
26	173.86	175.28	176.71	178.15	179.59
27	180.55	182.03	183.51	184.99	186.49
28	187.24	188.77	190.30	191.85	193.40
29	193.92	195.51	197.10	198.70	200.30
30	200.61	202.24	203.89	205.55	207.22
31	207.29	208.99	210.69	212.40	214.12



	50	.2	.4	.6	.8
.2	1.39	1.40	1.41	1.43	1.44
.4	2.78	2.81	2.83	2.85	2.87
.6	4.18	4.21	4.24	4.28	4.31
.8	5.57	5.61	5.66	5.70	5.75
Area.	6.96	7.02	7.07	7.13	7.19
2	13.92	14.04	14.15	14.26	14.37
3	20.89	21.05	21.22	21.39	21.56
4	27.85	28.07	28.30	28.52	28.75
5	34.81	35.09	35.37	35.65	35.94
6	41.78	42.11	42.45	42.78	43.12
7	48.74	49.13	49.52	49.91	50.31
8	55.70	56.15	56.60	57.05	57.50
9	62.66	63.17	63.67	64.18	64.68
10	69.63	70.19	70.75	71.31	71.87
11	76.59	77.20	77.82	78.44	79.06
12	83.55	84.22	84.89	85.57	86.25
13	90.52	91.24	91.97	92.70	93.43
14	97.48	98.26	99.04	99.83	100.62
15	104.44	105.28	106.12	106.96	107.81
16	111.40	112.30	113.19	114.09	115.00
17	118.37	119.32	120.27	121.22	122.18
18	125.33	126.33	127.34	128.35	129.37
19	132.29	133.35	134.42	135.48	136.56
20	139.26	140.37	141.49	142.62	143.75
21	146.22	147.39	148.57	149.75	150.93
22	153.18	154.41	155.64	156.88	158.12
23	160.14	161.43	162.71	164.01	165.31
24	167.10	168.45	169.79	171.14	172.49
25	174.07	175.46	176.86	178.27	179.68
26	181.03	182.48	183.94	185.40	186.87
27	187.99	189.50	191.01	192.53	194.06
28	194.96	196.52	198.09	199.66	201.24
29	201.92	203.54	205.16	206.79	208.43
30	208.88	210.55	212.24	213.92	215.62
31	215.85	217.58	219.31	221.05	222.81

	.51	.2	.4	.6	.8
.2	1.45	1.46	1.47	1.48	1.49
.4	2.90	2.92	2.94	2.97	2.99
.6	4.35	4.38	4.41	4.45	4.48
.8	5.79	5.84	5.89	5.93	5.98
Area.	7.24	7.30	7.36	7.41	7.47
2	14.49	14.60	14.72	14.83	14.95
3	21.73	21.90	22.07	22.25	22.42
4	28.98	29.20	29.43	29.66	29.89
5	36.22	36.50	36.79	37.08	37.36
6	43.46	43.80	44.15	44.49	44.84
7	50.71	51.11	51.51	51.91	52.31
8	57.95	58.41	58.86	59.32	59.78
9	65.20	65.71	66.22	66.74	67.26
10	72.44	73.01	73.58	74.15	74.73
11	79.68	80.31	80.94	81.57	82.20
12	86.93	87.61	88.30	88.99	89.68
13	94.17	94.91	95.65	96.40	97.15
14	101.42	102.21	103.01	103.42	104.62
15	108.66	109.51	110.37	111.23	112.09
16	115.90	116.81	117.73	118.65	119.57
17	123.15	124.11	125.09	126.06	127.04
18	130.39	131.42	132.45	133.48	134.52
19	137.64	138.72	139.80	140.89	141.99
20	144.88	146.02	147.16	148.31	149.46
21	152.12	153.32	154.52	155.73	156.93
22	159.37	160.62	161.88	163.14	164.41
23	166.61	167.92	169.24	170.56	171.88
24	173.86	175.22	176.59	177.97	179.35
25	181.10	182.52	183.95	185.39	186.83
26	188.34	189.82	191.31	192.80	194.30
27	195.59	197.12	198.67	200.22	201.77
28	202.83	204.43	206.03	207.63	209.25
29	210.08	211.73	213.38	215.05	216.72
30	217.32	219.03	220.74	222.46	224.19
31	224.56	226.33	228.10	229.88	231.67

	52	.2	.4	.6	.8
.2	1.51	1.52	1.53	1.54	1.55
.4	3.01	3.03	3.06	3.08	3.10
.6	4.52	4.55	4.59	4.62	4.66
.8	6.02	6.07	6.12	6.16	6.21
Area.	7.53	7.59	7.65	7.70	7.76
2	15.06	15.18	15.29	15.41	15.53
3	22.59	22.77	22.94	23.12	23.29
4	30.12	30.35	30.59	30.82	31.06
5	37.65	37.94	38.24	38.53	38.82
6	45.18	45.53	45.88	46.23	46.59
7	52.72	53.12	53.53	53.94	54.35
8	60.25	60.71	61.18	61.64	62.11
9	67.78	68.30	68.82	69.35	69.88
10	75.31	75.89	76.47	77.06	77.64
11	82.84	83.48	84.12	84.76	85.41
12	90.37	91.07	91.77	92.47	93.17
13	97.90	98.65	99.41	100.17	100.94
14	105.43	106.24	107.06	107.88	108.70
15	112.96	113.83	114.71	115.58	116.46
16	120.49	121.42	122.35	123.29	124.34
17	128.02	129.01	130.00	131.00	131.99
18	135.56	136.60	137.65	138.70	139.86
19	143.09	144.19	145.30	146.41	147.52
20	150.62	151.78	152.94	154.11	155.29
21	158.15	159.37	160.59	161.82	163.05
22	165.68	166.95	168.24	169.52	170.82
23	173.21	174.54	175.88	177.23	178.58
24	180.74	182.13	183.53	184.94	186.34
25	188.27	189.72	191.18	192.64	194.11
26	195.80	197.31	198.83	200.35	201.87
27	203.33	204.90	206.47	208.05	209.64
28	210.86	212.49	214.12	215.76	217.40
29	218.39	220.08	221.77	223.46	225.17
30	225.93	227.67	229.42	231.17	232.93
31	233.46	235.25	237.06	238.88	240.70



## A Table of Cylinders

	.2	.4	.6	.8
.2	1.56	1.58	1.59	1.60
.4	3.13	3.15	3.18	3.20
.6	4.69	4.73	4.76	4.80
.8	6.26	6.31	6.35	6.40
Area.	7.82	7.88	7.94	8.00
2	15.65	15.76	15.88	16.00
3	23.47	23.65	23.82	24.00
4	31.29	31.53	31.77	32.01
5	39.12	39.41	39.71	40.01
6	46.94	47.29	47.65	48.01
7	54.76	55.18	55.59	56.01
8	62.59	63.06	63.53	64.01
9	70.41	70.94	71.48	72.01
10	78.23	78.82	79.42	80.01
11	86.06	86.71	87.36	88.02
12	93.88	94.59	95.30	96.02
13	101.70	102.47	103.24	104.02
14	109.53	110.35	111.19	112.02
15	117.35	118.24	119.13	120.02
16	125.17	126.12	127.07	128.02
17	133.00	134.00	135.01	136.02
18	140.82	141.88	142.95	144.03
19	148.64	149.77	150.90	152.03
20	156.47	157.65	158.84	160.03
21	164.29	165.53	166.78	168.03
22	172.11	173.41	174.72	176.03
23	179.93	181.30	182.66	184.03
24	187.76	189.18	190.60	192.04
25	195.58	197.06	198.55	202.04
26	203.40	204.94	206.49	208.04
27	211.23	212.83	214.43	216.04
28	219.05	220.71	222.67	224.04
29	226.87	228.59	230.31	232.04
30	234.70	236.47	238.26	240.05
31	242.52	244.36	246.20	248.05



	.54	.2	.4	.6	.8
.2	1.62	1.64	1.65	1.66	1.67
.4	3.25	3.27	3.30	3.32	3.34
.6	4.87	4.91	4.94	4.98	5.02
.8	6.50	6.54	6.59	6.64	6.69
Area.	8.12	8.18	8.24	8.30	8.36
2	16.24	16.36	16.48	16.60	16.73
3	24.36	24.54	24.73	24.91	25.09
4	32.48	32.73	32.97	33.21	33.45
5	40.61	40.91	41.21	41.51	41.82
6	48.73	49.09	49.45	49.82	50.18
7	56.85	57.27	57.69	58.12	58.55
8	64.97	65.45	65.94	66.42	66.91
9	73.09	73.63	74.18	74.72	75.27
10	81.21	81.82	82.42	83.03	83.64
11	89.33	90.00	90.66	91.33	92.00
12	97.46	98.18	98.90	99.63	100.36
13	105.58	106.36	107.15	107.94	108.73
14	113.70	114.54	115.39	116.24	117.09
15	121.82	122.72	123.63	124.54	125.46
16	129.94	130.91	131.87	132.84	133.82
17	138.06	139.09	140.11	141.15	142.18
18	146.18	147.27	148.36	149.45	150.55
19	154.31	155.45	156.60	157.75	158.91
20	162.43	163.63	164.84	166.06	167.28
21	170.55	171.82	173.08	174.36	175.64
22	178.67	180.00	181.33	182.66	184.00
23	186.79	188.18	189.57	190.96	192.37
24	194.91	196.36	197.81	199.27	200.73
25	203.04	204.54	206.05	207.57	209.09
26	211.16	212.72	214.29	215.87	217.46
27	219.28	220.90	222.53	224.17	225.82
28	227.40	229.09	230.78	232.48	234.19
29	235.52	237.27	239.02	240.78	242.55
30	243.64	245.45	247.26	249.08	250.91
31	251.76	253.63	255.50	257.39	259.28

## A Table of Cylinders

	55	.2	.4	.6	.8
.2	1.68	1.70	1.71	1.72	1.73
.4	3.37	3.39	3.42	3.44	3.47
.6	5.05	5.09	5.13	5.16	5.20
.8	6.74	6.79	6.84	6.89	6.94
Area.	8.42	8.49	8.55	8.61	8.67
2	16.85	16.97	17.09	17.22	17.34
3	25.27	25.46	25.64	25.83	26.01
4	33.70	33.94	34.19	34.44	34.69
5	42.12	42.43	42.74	43.05	43.36
6	50.55	50.92	51.29	51.66	52.03
7	58.97	59.40	59.83	60.27	60.70
8	67.40	67.89	68.38	68.88	69.37
9	75.82	76.37	76.93	77.49	78.05
10	84.25	84.86	85.48	86.09	86.72
11	92.67	93.35	94.03	94.71	95.39
12	101.10	101.83	102.57	103.32	104.06
13	109.52	110.32	111.12	111.93	112.73
14	117.94	118.81	119.67	120.54	121.40
15	126.37	127.29	128.22	129.15	130.08
16	134.80	135.78	136.77	137.76	138.75
17	143.22	144.26	145.31	146.37	147.42
18	151.65	152.75	153.86	154.98	156.09
19	160.07	161.24	162.41	163.59	164.76
20	168.50	169.72	170.96	172.19	173.44
21	176.92	178.21	179.50	180.80	182.11
22	185.35	186.69	188.05	189.42	190.78
23	193.77	195.18	196.60	198.02	199.45
24	202.20	203.67	205.15	206.63	208.12
25	210.62	212.15	213.69	215.24	216.80
26	219.04	220.64	222.24	223.85	225.47
27	227.47	229.13	230.79	232.46	234.14
28	235.90	237.61	239.34	241.07	242.81
29	244.32	246.10	247.89	249.68	251.48
30	252.75	254.59	256.44	258.29	260.16
31	261.17	263.07	264.98	266.90	268.83

	.56	.2	.4	.6	.8
.2	1.75	1.76	1.77	1.78	1.80
.4	3.49	3.52	3.54	3.57	3.59
.6	5.24	5.28	5.31	5.35	5.39
.8	7.00	7.04	7.09	7.14	7.19
Area.	8.73	8.80	8.86	8.92	8.98
2	17.47	17.59	17.72	17.84	17.97
3	26.20	26.39	26.58	26.77	26.96
4	34.94	35.19	35.43	35.69	35.94
5	43.67	43.98	44.30	44.61	44.93
6	52.40	52.78	53.15	53.53	53.91
7	61.14	61.57	62.01	62.45	62.90
8	69.87	70.37	70.87	71.38	71.88
9	78.61	79.17	79.73	80.30	80.87
10	87.34	87.96	88.59	89.22	89.85
11	96.07	96.76	97.45	98.14	99.84
12	104.81	105.56	106.31	107.07	107.82
13	113.54	114.35	115.17	115.99	116.81
14	122.28	123.15	124.03	124.91	125.79
15	131.01	131.95	132.89	133.83	134.78
16	139.74	140.74	141.75	142.75	143.77
17	148.48	149.54	150.61	151.68	152.75
18	157.21	158.34	159.46	160.60	161.74
19	165.95	167.13	168.32	169.52	170.72
20	174.68	175.93	177.18	178.44	179.71
21	183.42	184.73	186.04	187.37	188.69
22	192.15	193.52	194.90	196.29	197.68
23	200.88	202.32	203.76	205.21	206.66
24	209.62	211.12	212.62	214.13	215.65
25	218.35	219.91	221.48	223.05	224.63
26	227.09	228.71	230.34	231.98	233.62
27	235.82	237.50	239.20	240.90	242.60
28	244.55	246.30	248.06	249.82	251.59
29	253.29	255.10	256.92	258.74	260.58
30	262.02	263.89	265.78	267.67	269.56
31	270.76	272.60	274.63	276.59	278.55



## A Table of Cylinders

	57	.2	.4	.6	.8
2	1.81	1.82	1.83	1.85	1.86
4	3.62	3.64	3.67	3.70	3.72
6	5.43	5.47	5.50	5.54	5.58
8	7.24	7.29	7.34	7.39	7.44
Area	9.05	9.11	9.18	9.24	9.30
2	18.10	18.22	18.35	18.48	18.61
3	27.15	27.34	27.53	27.72	27.91
4	36.19	36.45	36.70	36.96	37.22
5	45.24	45.56	45.88	46.20	46.52
6	54.29	54.67	55.06	55.44	55.83
7	63.34	63.79	64.23	64.68	65.13
8	72.39	72.90	73.41	73.92	74.44
9	81.44	82.01	82.58	83.16	83.74
10	90.49	91.12	91.76	92.40	93.04
11	99.54	100.24	100.94	101.64	102.35
12	108.58	109.35	110.11	110.88	111.65
13	117.63	118.46	119.29	120.12	120.96
14	126.68	127.57	128.47	129.36	130.26
15	135.73	136.69	137.64	138.60	139.57
16	144.78	145.80	146.82	147.84	148.87
17	153.83	154.91	155.99	157.08	158.18
18	162.88	164.02	165.17	166.32	167.48
19	171.93	173.13	174.35	175.56	176.78
20	180.98	182.25	183.52	184.80	186.09
21	190.02	191.36	192.70	194.04	195.39
22	199.07	200.47	201.88	203.28	204.70
23	208.12	209.58	211.05	212.52	214.00
24	217.17	218.70	220.23	221.76	223.31
25	226.22	227.81	229.40	231.00	232.61
26	235.27	236.92	238.58	240.24	241.92
27	244.32	246.03	247.76	249.48	251.22
28	253.37	255.15	256.93	258.72	260.53
29	262.41	264.26	266.11	267.96	269.83
30	271.46	273.37	275.29	277.21	279.13
31	280.51	282.48	284.46	286.45	288.44



	.58	.2	.4	.6	.8
.2	1.87	1.89	1.90	1.91	1.92
.4	3.75	3.77	3.80	3.82	3.85
.6	5.62	5.66	5.70	5.74	5.78
.8	7.49	7.55	7.60	7.65	7.70
Area	9.37	9.43	9.50	9.56	9.63
2	18.74	18.87	19.00	19.13	19.26
3	28.11	28.30	28.50	28.69	28.89
4	37.48	37.73	37.99	38.25	38.52
5	46.84	47.17	47.49	47.82	48.15
6	56.21	56.60	56.99	57.38	57.77
7	65.58	66.04	66.49	66.95	67.40
8	74.95	75.47	75.99	76.51	77.03
9	84.32	84.90	85.49	86.07	86.66
10	93.69	94.34	94.99	95.64	96.29
11	103.06	103.77	104.49	105.20	105.92
12	112.43	113.21	113.98	114.77	115.55
13	121.80	122.64	123.48	124.33	125.18
14	131.17	132.07	132.98	133.89	134.81
15	140.54	141.51	142.48	143.46	144.44
16	149.90	150.94	151.98	153.02	154.07
17	159.27	160.38	161.48	162.59	163.70
18	168.64	169.81	170.98	172.15	173.32
19	178.01	179.24	180.48	181.71	182.95
20	187.38	188.68	189.98	191.28	192.58
21	196.75	198.11	199.47	200.84	202.21
22	206.12	207.54	208.97	210.40	211.84
23	215.49	216.98	218.47	219.97	221.47
24	224.86	226.41	227.97	229.53	231.10
25	234.23	235.85	237.47	239.10	240.73
26	243.60	245.28	246.97	248.66	250.36
27	252.96	254.71	256.47	258.22	259.99
28	262.33	264.15	265.97	267.79	269.62
29	271.70	273.58	275.46	277.35	279.25
30	281.07	283.02	284.96	286.92	288.88
31	290.44	292.45	294.46	296.48	298.50

## A Table of Cylinders

	.59	.2	.4	.6	.8
.2	1.94	1.95	1.96	1.98	1.99
.4	3.88	3.90	3.93	3.96	3.98
.6	5.82	5.86	5.89	5.93	5.97
.8	7.75	7.81	7.86	7.91	7.97
Area.	9.69	9.76	9.83	9.89	9.96
2	19.39	19.52	19.65	19.79	19.92
3	29.08	29.28	29.48	29.68	29.88
4	38.78	39.04	39.31	39.57	39.84
5	48.47	48.80	49.13	49.47	49.80
6	58.17	58.56	58.96	59.36	59.76
7	67.86	68.32	68.75	69.25	69.72
8	77.56	78.09	78.61	79.14	79.68
9	87.25	87.85	88.44	89.04	89.64
10	96.95	97.61	98.27	98.93	99.60
11	106.64	107.37	108.09	108.82	109.56
12	116.34	117.13	117.92	118.72	119.52
13	126.03	126.89	127.75	128.61	129.48
14	135.73	136.65	137.58	138.50	139.43
15	145.42	146.41	147.40	148.40	149.39
16	155.12	156.17	157.23	158.29	159.35
17	164.81	165.93	167.06	168.18	169.31
18	174.51	175.69	176.88	178.08	179.27
19	184.20	185.45	186.71	187.97	189.23
20	193.90	195.22	196.54	197.86	199.19
21	203.59	204.98	206.36	207.76	209.15
22	213.29	214.74	216.19	217.65	219.11
23	222.98	224.50	226.02	227.54	229.07
24	232.68	234.26	235.84	237.44	239.03
25	242.37	244.02	245.67	247.33	248.99
26	252.07	253.78	255.50	257.22	258.95
27	261.76	263.54	265.33	267.12	268.91
28	271.46	273.30	275.15	277.01	278.87
29	281.15	283.06	284.98	286.90	288.83
30	290.85	292.82	294.81	296.80	298.79
31	300.54	302.58	304.63	306.69	308.75

	60	.2	.4	.6	.8
.2	2.00	2.02	2.03	2.04	2.06
.4	4.01	4.04	4.06	4.09	4.12
.6	6.01	6.05	6.10	6.14	6.18
.8	8.02	8.07	8.13	8.18	8.24
Area.	10.03	10.09	10.16	10.23	10.29
2	20.05	20.19	20.32	20.45	20.59
3	30.08	30.28	30.48	30.68	30.89
4	40.10	40.37	40.64	40.91	41.18
5	50.13	50.47	50.80	51.14	51.48
6	60.16	60.56	60.96	61.37	61.77
7	70.18	70.65	71.12	71.59	72.07
8	80.21	80.75	81.28	81.82	82.36
9	90.24	90.84	91.44	92.05	92.66
10	100.26	100.93	101.60	102.28	102.95
11	110.29	111.03	111.76	112.51	113.25
12	120.32	121.12	121.93	122.73	123.55
13	130.34	131.21	132.09	132.96	133.84
14	140.37	141.31	142.25	143.19	144.14
15	150.40	151.40	152.41	153.42	154.43
16	160.42	161.49	162.57	163.65	164.73
17	170.45	171.59	172.73	173.87	175.02
18	180.47	181.68	182.89	184.10	185.32
19	190.50	191.77	193.05	194.33	195.61
20	200.53	201.87	203.21	204.56	205.91
21	210.55	211.96	213.37	214.78	216.20
22	220.58	222.05	223.53	225.01	226.50
23	230.61	232.14	233.69	235.24	236.80
24	240.63	242.24	243.85	245.47	247.09
25	250.66	252.33	254.01	255.70	257.39
26	260.69	262.42	264.17	265.92	267.68
27	270.71	272.52	274.33	276.15	277.98
28	280.74	282.61	284.49	286.38	288.27
29	290.76	292.70	294.65	296.61	298.57
30	300.79	302.80	304.81	306.84	308.86
31	310.82	312.89	314.97	317.06	319.16



THE  
DESCRIPTION and USE  
OF THE  
*TABLE of CYLINDERS.*

**I**N the top of the said Table is placed the Diameter in Inches, and Two Tenths of an Inch, from one Inch to Sixty Inches Diameter, beginning in the first Page of the Table 1. 2. 4. 6. 8, which is One Inch Diameter, One Inch Two Tenths Diam. One Inch Four Tenths Diam. One Inch Six Tenths Diam. One Inch Eight Tenths Diameter. In the next Page Two Inches Diameter, and so increasing to Sixty Inches. On the top of each Page, in the first Column on the left hand, is the depth of a Cylinder, beginning 2, 4, 6, 8 Tenths of an Inch, and increasing to 31 Inches in Depth. The number in the other Columns is the Content in Ale Gallons, and Hundred Parts, answering to the Diam. on the top of the Table, and the Depth in the first Column in the side of the Table.

The Use of this Table is for the speedy Gauging of Beer, Ale, or Worts, in small Tubs, Keelers, Tuns and Coppers, whether Round or Oval, and for all sorts of Casks; which shall be made plain and easie to the meanest Capacities by these following Examples.

*Gauging of Worts in Tubs and Keelers by the*  
**TABLE of CYLINDERS.**

*Example I. Of a Round Tub.*

Let there be a Tub or Keeler, whose mean Diameter is 19 Inches, and Depth in Liquor 8 Inches.

First



First seek the Diameter 19 Inches in the Top of the Table, and against 8 in the side of the Table (and under 19) is 8.04, that is 8 Gallons, and 4 Parts of a Gallon, the Gallon being supposed to be divided into 100 Parts, which is the Content of Ale or Worts in that Tub.

*Example II. Where the Diameter and Depth fall out to be in odd Parts of an Inch.*

Suppose the Diameter 54.6 Tenths of an Inch, the Depth is 7.8 Tenths of an Inch. In the top of the Table find 54.6.

Underneath 54.6, and against 7 Inches, is 58.12  
And against 8 Tenths of an Inch is 6.64

Which being added together is 64.76

That is, 64 Gallons, and 76 Parts of a Gallon, which is about 3 Quarts.

*Note,* That most of these small Tubs or Keelers are generally bigger at the top than the bottom, therefore take your Diameter in the middle: Suppose the Depth to be 8 Inches, the Diameter is to be taken 4 Inches from the top or bottom, which is near enough in practice.

### *Gauging of OVALS by the TABLE of CYLINDERS.*

The adding the longer and shorter together, and taking the half for a Mean Diameter, is erroneous: But in small Vessels, where the difference in Diameters is not much, the Errour will be small.

## E X A M P L E.

Let there be an Oval, whose longest Diameter is 53 Inches, and shortest 45, these being added together make 98, the half of which is 49, which being taken for a Mean Diameter, the Depth being supposed to be 6 Inches, under 49 in the Table of *CYLINDERS*, and against 6 (the Depth) is 40.12 Gallons, which is too much by one third of a Gallon.

But to Gauge an Oval true, multiply the Diameters one into the other, and extract the Square Root, and that is the true Mean Diameter. But to avoid the trouble of extracting the Square Root, you have here a Table of *SQUARES*, from One to Sixty Inches, and to every Two Tenths of an Inch, which will much facilitate the Work. Which is now increased to 100 Inches, by Mr. *WALKER*.

## E X A M P L E.

Let there be the same Oval, whose longest Diameter is 53 Inches, and the shortest 45 Inches, multiply these Two Diameters one into the other, the Product is 2385, which seek for in the Table of *Squares*, but it being not to be found there, take the nearest Number, which is 2381, and against that is 48.8 for the Root, which seek in the Table of *Cylinders*, and against 6 (the Depth) you have 39.79 Gallons, which is the true Content, but less than the Content given by the vulgar way One third of a Gallon. And so the Errour is more or less, according to the bigness of the Vessel, and difference of Diameters.

# The Use of the TABLE of CYLINDERS to lar- ger Diameters.

By R. WALKER.

IN using the Tables of *Cylinders* for greater Diameters, if you can find any number that will Divide your Diameter given, without leaving a Remainder, multiply the *Area* of such a *Cylinder*, by the square of that number, gives the Content.

## EXAMPLE.

2) 104 Diameter, 25 Depth.  
52 half the Diameter.

Under 52 and against 25	188.27
Mmultiplied by 4 the Square of 2	4
	<hr/> 753.08

3) 123 Diameter, Depth 30.  
41 one  $\frac{1}{3}$  of the Diameter.

Under 41 and against 30	140.45
Mmultiplied by 9 the square of 3	9
	<hr/> 1264.05



(66)

5) 265 Diameter, Depth 41.  
53 the Fifth part of the Diam.

Under 53, and against 21	164.29
and against 20	156.47
41	320.76
Multiplied by 25, the Square of 5	25
	160380
	64152
	801900

There is a Well whose Diameter is 608 Inches, and the Depth 300, I demand how many Barrels Ale-Measure will this hold, I Divide 608 by 10, which is done by alwaies changing the last figure to a Decimal, which will be 60.8.

Under 60.8 and against 30 — 308.86  
Multip. by 10, the  $\frac{1}{10}$  for 300 10

3088.60

Multipl. by 100 the Sq. of 10 — 100

Divid. by 32, gives cont. 32) 3088 60.00 (9651.8

208
166
60
280
24

This is only to show that a little skill will serve to use the Table of *Cylinders*, to very large dimensions.

## TABLE of SQUARES,

From One Inch to 60, and to every  
Two Tenths of an Inch.

And increased from 61 Inches to 100, and to every  
two Tenths of an Inch.

By *RICHARD WALKER.*

(1)	1.00	(6)	36.00	(11)	121.00
.2	1.44	.2	38.44	.2	125.44
.4	1.96	.4	40.96	.4	129.96
.6	2.56	.6	43.56	.6	134.56
.8	3.24	.8	46.24	.8	139.24
(2)	4.00	(7)	49.00	(12)	144.00
.2	4.84	.2	51.84	.2	148.84
.4	5.76	.4	54.76	.4	153.76
.6	6.76	.6	57.76	.6	158.76
.8	7.84	.8	60.84	.8	163.84
(3)	9.00	(8)	64.00	(13)	169.00
.2	10.24	.2	67.24	.2	174.24
.4	11.56	.4	70.56	.4	179.56
.6	12.96	.6	73.96	.6	184.69
.8	14.44	.8	77.44	.8	190.44
(4)	16.00	(9)	81.00	(14)	196.00
.2	17.64	.2	84.64	.2	201.64
.4	19.36	.4	88.36	.4	207.36
.6	21.16	.6	92.16	.6	213.16
.8	23.04	.8	96.04	.8	219.04
(5)	25.00	(10)	100.00	(15)	225.00
.2	27.04	.2	104.04	.2	231.04
.4	29.16	.4	108.16	.4	237.16
.6	31.36	.6	112.36	.6	243.36
.8	33.64	.8	116.64	.8	249.64

## A Table of SQUARES.

(16)	256.00	(22)	484.00	(28)	784.00
.2	262.44	.2	492.84	.2	795.24
.4	268.96	.4	501.76	.4	806.56
.6	275.56	.6	510.76	.6	817.96
.8	282.24	.8	519.84	.8	829.44
(17)	289.00	(23)	529.00	(29)	841.00
.2	295.84	.2	538.24	.2	852.64
.4	302.76	.4	547.56	.4	864.36
.6	309.76	.6	556.96	.6	876.16
.8	316.84	.8	566.44	.8	888.04
(18)	324.00	(24)	576.00	(30)	900.00
.2	331.24	.2	585.64	.2	912.04
.4	338.56	.4	595.36	.4	924.16
.6	345.96	.6	605.16	.6	936.36
.8	353.44	.8	615.04	.8	948.04
(19)	361.00	(25)	625.00	(31)	961.00
.2	368.64	.2	635.04	.2	973.44
.4	376.36	.4	645.16	.4	985.96
.6	384.16	.6	655.36	.6	998.56
.8	392.04	.8	665.64	.8	1011.24
(20)	400.00	(26)	676.00	(32)	1024.00
.2	408.04	.2	686.44	.2	1036.84
.4	416.16	.4	696.96	.4	1049.76
.6	424.36	.6	707.56	.6	1062.76
.8	432.64	.8	718.24	.8	1075.84
(21)	441.00	(27)	729.00	(33)	1089.00
.2	449.44	.2	739.84	.2	1102.24
.4	457.96	.4	750.76	.4	1115.56
.6	466.56	.6	761.76	.6	1128.96
.8	475.24	.8	772.84	.8	1142.44

## A Table of SQUARES.

(34)	1156.00	(40)	1600.00	(46)	2116.00
.2	1169.64	.2	1616.04	.2	2134.44
.4	1183.36	.4	1632.16	.4	2152.96
.6	1197.16	.6	1648.36	.6	2171.56
.8	1211.04	.8	1664.64	.8	2190.24
(35)	1225.00	(41)	1681.00	(47)	2209.00
.2	1239.04	.2	1697.44	.2	2227.84
.4	1253.16	.4	1713.96	.4	2246.76
.6	1267.36	.6	1730.56	.6	2265.76
.8	1281.64	.8	1747.24	.8	2284.84
(36)	1296.00	(42)	1764.00	(48)	2304.00
.2	1310.44	.2	1780.84	.2	2323.24
.4	1324.96	.4	1797.76	.4	2342.56
.6	1339.56	.6	1814.76	.6	2361.96
.8	1354.24	.8	1831.84	.8	2381.44
(37)	1369.00	(43)	1849.00	(49)	2401.00
.2	1383.84	.2	1866.24	.2	2420.64
.4	1398.76	.4	1883.56	.4	2440.36
.6	1413.76	.6	1900.96	.6	2460.16
.8	1428.84	.8	1918.44	.8	2480.04
(38)	1444.00	(44)	1936.00	(50)	2500.00
.2	1459.24	.2	1953.64	.2	2520.04
.4	1474.56	.4	1971.36	.4	2540.16
.6	1489.96	.6	1989.16	.6	2560.36
.8	1505.44	.8	2007.04	.8	2580.64
(39)	1521.00	(45)	2025.00	(51)	2601.00
.2	1536.64	.2	2043.04	.2	2621.44
.4	1552.36	.4	2061.16	.4	2641.96
.6	1568.16	.6	2079.36	.6	2662.56
.8	1584.04	.8	2097.64	.8	2683.28



## A Table of SQUARES.

(52)	2704.00	(58)	3364.00	(64)	4096.00
.2	2724.84	.2	3387.24	.2	4121.64
.4	2745.76	.4	3410.56	.4	4147.36
.6	2766.76	.6	3433.96	.6	4173.16
.8	2787.84	.8	3457.44	.8	4199.04
(53)	2809.00	(59)	3481.00	(65)	4225.00
.2	2830.24	.2	3504.64	.2	4251.04
.4	2851.56	.4	3528.36	.4	4277.16
.6	2872.96	.6	3552.16	.6	4303.36
.8	2894.44	.8	3576.04	.8	4329.64
(54)	2916.00	(60)	3600.00	(66)	4356.00
.2	2937.64	.2	3624.04	.2	4382.44
.4	2959.36	.4	3648.16	.4	4408.96
.6	2981.16	.6	3672.36	.6	4435.56
.8	3003.04	.8	3696.64	.8	4462.24
(55)	3025.00	(61)	3721.00	(67)	4489.00
.2	3047.04	.2	3745.44	.2	4515.84
.4	3069.16	.4	3769.96	.4	4542.76
.6	3091.36	.6	3794.56	.6	4569.76
.8	3113.64	.8	3819.24	.8	4596.84
(56)	3136.00	(62)	3844.00	(68)	4624.00
.2	3158.44	.2	3868.84	.2	4651.24
.4	3180.96	.4	3893.76	.4	4678.56
.6	3203.56	.6	3918.76	.6	4705.96
.8	3226.24	.8	3943.84	.8	4733.44
(57)	3249.00	(63)	3969.00	(69)	4761.00
.2	3271.84	.2	3994.24	.2	4788.64
.4	3294.76	.4	4019.56	.4	4816.36
.6	3317.76	.6	4044.96	.6	4844.16
.8	3340.84	.8	4070.44	.8	4872.04

## A Table of SQUARES.

(70) 4900.00	(76) 5776.00	(82) 6724.00
.2 4928.04	.2 5806.44	.2 6756.84
.4 4956.16	.4 5836.96	.4 6789.76
.6 4984.36	.6 5867.56	.6 6822.76
.8 5012.64	.8 5898.24	.8 6855.84
(71) 5041.00	(77) 5929.00	(83) 6889.00
.2 5069.44	.2 5959.84	.2 6922.24
.4 5097.96	.4 5990.76	.4 6955.56
.6 5126.56	.6 6021.76	.6 6988.96
.8 5155.24	.8 6052.84	.8 7022.44
(72) 5184.00	(78) 6084.00	(84) 7056.00
.2 5212.84	.2 6115.24	.2 7089.64
.4 5241.76	.4 6146.56	.4 7123.36
.6 5270.76	.6 6177.96	.6 7157.16
.8 5299.84	.8 6209.44	.8 7191.04
(73) 5329.00	(79) 6241.00	(85) 7225.00
.2 5358.24	.2 6272.64	.2 7259.04
.4 5387.56	.4 6304.36	.4 7293.16
.6 5416.96	.6 6336.16	.6 7327.36
.8 5446.44	.8 6368.04	.8 7361.64
(74) 5476.00	(80) 6400.00	(86) 7396.00
.2 5505.64	.2 6432.04	.2 7430.44
.4 5535.36	.4 6464.16	.4 7464.96
.6 5565.16	.6 6496.36	.6 7499.56
.8 5595.04	.8 6528.64	.8 7534.24
(75) 5625.00	(81) 6561.00	(87) 7569.00
.2 5655.04	.2 6593.44	.2 7603.84
.4 5685.16	.4 6625.96	.4 7638.76
.6 5715.36	.6 6658.56	.6 7673.76
.8 5745.64	.8 6691.24	.8 7708.84

## A Table of SQUARES.

(88) 7744.00	(92) 8464.00	(96) 9216.00
.2 7779.24	.2 8500.84	.2 9254.44
.4 7814.56	.4 8537.76	.4 9292.96
.6 7849.96	.6 8574.76	.6 9331.56
.8 7885.44	.8 8611.84	.8 9370.24
(89) 7921.00	(93) 8649.00	(97) 9409.00
.2 7956.64	.2 8686.24	.2 9447.84
.4 7992.36	.4 8723.56	.4 9486.76
.6 8028.16	.6 8760.96	.6 9525.76
.8 8064.04	.8 8798.44	.8 9564.84
(90) 8100.00	(94) 8836.00	(98) 9604.00
.2 8136.04	.2 8873.64	.2 9643.24
.4 8172.16	.4 8911.36	.4 9682.56
.6 8208.36	.6 8949.16	.6 9721.96
.8 8244.64	.8 8987.04	.8 9761.44
(91) 8281.00	(95) 9025.00	(99) 9801.00
.2 8317.44	.2 9063.84	.2 9840.64
.4 8353.96	.4 9101.16	.4 9880.36
.6 8390.56	.6 9139.36	.6 9920.16
.8 8427.24	.8 9177.64	.8 9960.04
		(100) 10000.00

CASK-

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# CASK-GAUGING

## BY THE

### *TABLE of CYLINDERS.*

**I**F the Head and Boun<sup>d</sup> Diameter of a Cask be equal, 'tis a *Cylinder*. Enter the Table of *Cylinders* with the Diameter, and in the first Column of the Table seek the Length, and underneath the Diameter, and against the Length you have the Content in Gallons and Hundred Parts of a Gallon.

*As for Example.*

Suppose the Diameter 19 Inches, and the Length 20 Inches, under 19 and against 20 you have 20.11, that is, Twenty Gallons, and  $\frac{11}{100}$  parts of a Gallon.

But all Cask, not being *Cylinders*, must be reduced, or supposed to be reduced into *Cylinders*, by finding a Mean between Head and Boun<sup>d</sup>; which being found, enter the Table, as before was show'd, for *Cylinders*, and you have the Content.

#### *The Gauging of Drum-Cask by the Table of Cylinders.*

First, for a Drum-Cask, they differing but little from *Cylinders*, and the difference of Diameters seldom exceeding an Inch and an half, add half the difference to the lesser Diameter, and that gives the Mean Diameter: Then proceed as was show'd in a *Cylinder*.

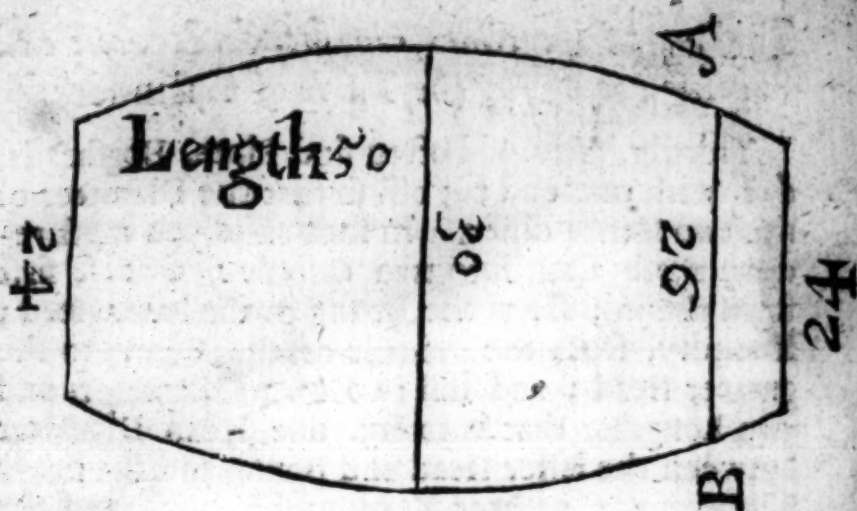


# *The Gauging of Spheroidal Cask by the Table of CYLINDERS.*

Secondly, for those Casks, whose Staves are arching and rising at the Bounge, as Pipes, Hogheads, Barrels, Kilderkins, and such like, take the difference between Head and Bounge Diameter, and with that difference enter the annexed Table, against which you will find a Number, which added to the lesser Diameter will make a Mean between Head and Bounge.

*A Table to reduce a Spheroid to a Cylinder.*

(1) 0.7	(5) 3.6+	(9) 6.4+
.2 0.8—	.2 3.6—	.2 6.4—
.4 1.0+	.4 3.8+	.4 6.6+
.6 1.0—	.6 4.0+	.6 6.8+
.8 1.2—	.8 4.0—	.8 6.8—
(2) 1.4	(6) 4.2	(10) 7.0
.2 1.6+	.2 4.4+	.2 7.2+
.4 1.8+	.4 4.4—	.4 7.4+
.6 1.8—	.6 4.6—	.6 7.4—
.8 2.0+	.8 4.8+	.8 7.6+
(3) 2.0—	(7) 4.8	
.2 2.2—	.2 5.0—	
.4 2.4+	.4 5.2+	
.6 2.6	.6 5.4+	
.8 2.6—	.8 5.4—	
(4) 2.8	(8) 5.6	
.2 3.0+	.2 5.8+	
.4 3.0—	.4 5.8—	
.6 3.2—	.6 6.0—	
.8 3.4+	.8 6.2+	



*As for Example*

Let there be a Cask (as the annexed Diagram) whose length is 50 Inches, Young Diameter 30 Inches, Head Diameter 24 Inches, the difference is 6 Inches, against 6 in the preceding Table you have 4.2, which being added to the lesser Diameter 24 Inches, makes 28.2 Inches: Seek 28.2 in the top of the Table of *Cylinders*, and underneath that against 25 (half the Casks Length)

You have 55.37

Which being set down again thus 55.37

And added together makes 110.74 Ale Gall.  
the Content of the said Cask.

*Note*, That when the Length of your Cask is less than 31 Inches, you have the Content by inspection in the Table; but if your Length be above 31, then you must divide your Length into two parts, and add the Contents together, as in this last Example.

*To Gauge Pipes, Butts, Hogsheds, &c. one end being cut off, by the Table of Cylinders.*

Thirdly, You will often find Pipes, Hogsheds, &c. with one end cut off, so that the Diameter of the two Heads differ. In such cases, you must reduce those Cask into two *Cylinders*, that is, first from the middle of the Bounge to the lesser Head; secondly, from the middle of the Bounge to the greater Head; and find two Mean Diameters and two Lengths, that is to say, one Mean Diameter between the lesser Head and Bounge, and the other between the greater Head and Bounge, and the Length between the Lesser Head and Bounge, and the Length between the greater Head and Bounge: Find the Content in the Table, answering to each Diameter and Length, which added together, is the Content of the Cask.

*As for Example.*

Suppose in the last Figure the Cask was cut off at A B, the Length of the Cask from the lesser Head to the middle of the Bounge 25 Inches, the Bounge Diameter 30, the lesser Head 24 Inches; the length of the Cask from the middle of the Bounge to the greater Head 20 Inches, the greater Head Diameter 26 Inches; the difference between the lesser Head and the Bounge Diameter is 6 Inches, which seek in the foregoing Table, and against it you have 4.2, which added to the lesser Diameter 24 Inches, makes 28.2; the Length being 25 Inches; look in the Table of *Cylinders* for 28.2 (the Diameter) and under that and against 25 (the Length) you have 55.37, which is the Content of that part of the Cask. The Difference between the greater Head and Bounge Diameter is 4 Inches, answering to which in the foregoing Table you will find 2.8, which being added to 26 Inches, the Head Diameter, makes 28.8,

28.8, the Mean Diameter for the shorter part of the Cask. Having found 28.8 in the Table of *Cylinders*, underneath that and against 20, the Length,

You will find 46.20

Which added to the other part before found 55.37

The Sum is the Content of that Cask 101.57

*To Gauge Churn Cask by the Table of Cylinders.*

Fourthly, A fourth sort of Cask, which are made and used in the Country, are called Churn Cask, that is, the Frustum or part of a Cone, standing upon its lesser Base: To Gauge which, add half the Difference of the Diameters to the lesser Diameter, then seek in the Table of *Cylinders* for that lesser Diameter, so increased, and reserve the Number answering to the Diameter and Length: Then enter again the said Table with the half Difference of the Diameters, and seek for a third part of the Length of the whole Cask, and the Number against that and under the half Difference added to the former reserved Number will be the Content of the said Cask. *As for Example.*

Suppose the bigger Diameter 38 Inches, the lesser Diameter 26 Inches, the Depth 39 Inches; 6 Inches the half Difference of Diameters added to the lesser Diameter 26 makes 32, which find in the Table of *Cylinders* thus:

Against 19 and under 32 you have 54.19  
And against 20 and under 32 you have 57.04

Depth 39 Number to be reserv'd 111.23

Then enter the Table with 6 the half Difference and against 13 the third part of the Depth,

You have 1.30

To which add the reserv'd Number 111.23

And you have the Content of that Cask 112.53



*To Gauge Wine Cask by the Table of  
Cylinders also.*

For Gauging of Wine Cask, find the Content in Ale-Measure as before is directed, which being found, multiply it by 1.22, and cut off the Place of Decimals, and you have the Content in Wine Gallons.

*For Example.*

A Cask containing 110.75 of Ale Gallons, how many does it contain of Wine Gallons.

$$\begin{array}{r}
 110.75 \\
 \times 1.22 \\
 \hline
 22150 \\
 22150 \\
 11075 \\
 \hline
 135.1150
 \end{array}$$

The Content is 135 Gallons of Wine.

A  
**T A B L E**  
 O F  
**CIRCUMFERENCES.**

A N S W E R I N G

From *One Inch* to *Sixty*, and to every  
*Two Tenths* of an *Inch*.

Applied to the Gauging of Cask standing upright,  
 where no Bounge Diameter can be taken other-  
 wise: Which is also of great Use for the Gauging  
 of Cider, where it may be prejudicial to open the  
 Bounge.

(1)	3.1	(4)	12.6	(7)	22.0
.2	3.8	.2	13.2	.2	22.6
.4	4.4	.4	13.8	.4	23.2
.6	5.0	.6	14.4	.6	23.8
.8	5.6	.8	15.0	.8	24.5
(2)	6.3	(5)	15.7	(8)	25.1
.2	7.0	.2	16.3	.2	25.8
.4	7.5	.4	17.0	.4	26.4
.6	8.2	.6	17.6	.6	27.0
.8	8.8	.8	18.2	.8	27.6
(3)	9.4	(6)	18.8	(9)	28.3
.2	10.0	.2	19.5	.2	28.9
.4	10.7	.4	20.0	.4	29.5
.6	11.3	.6	20.7	.6	30.1
.8	12.0	.8	21.3	.8	30.8

A Table of *Diameters and Circumferences.*

(10)	31.4	(16)	50.2	(22)	69.1
.2	32.0	.2	50.9	.2	69.7
.4	32.7	.4	51.5	.4	70.4
.6	33.3	.6	52.2	.6	71.0
.8	33.9	.8	52.8	.8	71.6
(11)	34.6	(17)	53.4	(23)	72.2
.2	35.2	.2	54.0	.2	72.9
.4	35.8	.4	54.6	.4	73.5
.6	36.9	.6	55.2	.6	74.1
.8	37.0	.8	55.9	.8	74.8
(12)	37.7	(18)	56.5	(24)	75.4
.2	38.3	.2	57.2	.2	76.0
.4	39.0	.4	57.8	.4	76.6
.6	39.6	.6	58.4	.6	77.3
.8	40.2	.8	59.1	.8	78.0
(13)	40.8	(19)	59.7	(25)	78.5
.2	41.4	.2	60.3	.2	79.1
.4	42.0	.4	60.9	.4	79.8
.6	42.7	.6	61.6	.6	80.4
.8	43.3	.8	62.2	.8	81.0
(14)	44.0	(20)	62.8	(26)	81.6
.2	44.6	.2	63.4	.2	82.3
.4	45.2	.4	64.0	.4	82.9
.6	45.8	.6	64.7	.6	83.5
.8	46.5	.8	65.3	.8	84.2
(15)	47.1	(21)	65.9	(27)	84.8
.2	47.7	.2	66.6	.2	85.4
.4	48.4	.4	67.2	.4	86.1
.6	49.0	.6	67.8	.6	86.7
.8	49.6	.8	68.5	.8	87.3

A Table of *Diameters* and *Circumferences*.

(28)	88.0	(34)	106.8	(40)	125.6
.2	88.6	.2	107.4	.2	126.3
.4	89.2	.4	108.0	.4	126.9
.6	89.8	.6	108.7	.6	127.5
.8	90.5	.8	109.3	.8	128.1
(29)	91.1	(35)	109.9	(41)	128.8
.2	91.7	.2	110.6	.2	129.4
.4	92.3	.4	111.2	.4	130.0
.6	93.0	.6	111.8	.6	130.6
.8	93.6	.8	112.4	.8	131.3
(30)	94.2	(36)	113.1	(42)	131.9
.2	94.9	.2	113.7	.2	132.5
.4	95.5	.4	114.3	.4	133.2
.6	96.1	.6	114.9	.6	133.8
.8	96.7	.8	115.6	.8	134.4
(31)	97.4	(37)	116.2	(43)	135.0
.2	98.0	.2	116.8	.2	135.7
.4	98.6	.4	117.5	.4	136.3
.6	99.2	.6	118.1	.6	136.9
.8	99.9	.8	118.7	.8	137.6
(32)	100.5	(38)	119.3	(44)	138.2
.2	101.1	.2	120.0	.2	138.8
.4	101.8	.4	120.6	.4	139.4
.6	102.4	.6	121.2	.6	140.0
.8	103.0	.8	121.8	.8	140.7
(33)	103.6	(39)	122.5	(45)	141.3
.2	104.3	.2	123.1	.2	141.9
.4	104.9	.4	123.7	.4	142.6
.6	105.5	.6	124.4	.6	143.2
.8	106.2	.8	125.0	.8	143.8



A Table of *Diameters* and *Circumferences*.

(46)	144.5	(51)	160.1	(56)	175.8
.2	145.0	.2	160.8	.2	176.4
.4	145.7	.4	161.4	.4	177.1
.6	146.4	.6	162.0	.6	177.8
.8	147.0	.8	162.6	.8	178.4
(47)	147.6	(52)	163.3	(57)	179.0
.2	148.2	.2	163.9	.2	179.6
.4	148.8	.4	164.6	.4	180.2
.6	149.5	.6	165.2	.6	180.8
.8	150.1	.8	165.8	.8	181.5
(48)	150.7	(53)	166.4	(58)	182.1
.2	151.4	.2	167.1	.2	182.8
.4	152.0	.4	167.8	.4	183.4
.6	152.6	.6	168.3	.6	184.0
.8	153.3	.8	169.0	.8	184.6
(49)	153.9	(54)	169.6	(59)	185.3
.2	154.5	.2	170.2	.2	185.9
.4	155.2	.4	170.8	.4	186.6
.6	155.8	.6	171.5	.6	187.2
.8	156.4	.8	172.1	.8	187.8
(50)	157.0	(55)	172.8	(60)	188.4
.2	157.6	.2	173.4	.2	189.0
.4	158.3	.4	174.0	.4	189.8
.6	158.9	.6	174.6	.6	190.3
.8	159.5	.8	175.2	.8	191.0

*To Gauge Cask full of Lignor by the Table of*  
**C Y L I N D E R S.**

*The Use of the foregoing T A B L E.*

**I**T may oftentimes so happen, that you cannot take the Bounge Diameter, by reason the Cask standing upon one end, and having no Bounge-hole; or a Cask being full, which might be prejudiced by the opening of the Bounge: In such cases girt the Cask in the Bounge place, and having the Circumference, find the Bounge Diameter Arithmetically: But this being intended as a help for those that be not skill'd in Multiplication and Division, and for ease of those that are, I have here Calculated a Table of *Circumferences*, answering to the Diameter in Inches and Two Tenths, from One to Sixty Inches. By which Table, in the Column for *Circumferences*, you must look for the *Circumference* found by the Girt of the Cask, and against it on the left hand you have the Diameter; then allowing for the thickness of the Wood according to discretion, which is seldom above two, or under one Inch, you have the Diameter sought.

*Example in the Cask pag. 75.*

Suppose the Cask being girt at the Bounge, I find the *Circumference* to be 99.2, in the Table of *Circumferences*, against it I find 31.6; then allowing 1.6 for the thickness of the Staves; supposing each Stave to be 0.8 of an Inch thick, you have 30 for your Bounge Diameter: Then take the Length, and the Head Diameter, as before is directed, and you have the Content by the Table of *Cylinders*.

To

To Gauge a Churn Cask when it standeth upon one end, that you cannot take the Bottom Diameter, girt the Cask in the Middle, and find the Diameter by the Table, and having allowed for the thickness of the wood, enter the Table of *Cylinders* with the Diameter and length of the Cask, and the number then found reserve : Then enter the Table of *Cylinders* again with the difference between the Diameter of the Middle of the Cask found, and the Diameter of the Top of the Cask, and the Number found against the third part of the Length add to the former reserved Diameter ; and you have the content of the Cask.

*Example pag. 73.*

Suppose the Churn Cask to be girt in the middle to be 106.2 against which in the Table of *Circumferences*, in the Column for *Diameters*, you have 33.8, the Diameter of that Cask : Then supposing the Staves 0.9 of an Inch thick, allow 1.8 Inch for the thickness of the wood, and you have 32 Inches for your Inside Diameter. Then in the Table of *Cylinders* look for 32 the Diameter, and 39 the Length, the Content whereof is 111.23, which reserve : Then 6 being the Difference between the Diameter of the Middle of the Cask and the Diameter at the Top, enter the Table of *Cylinders* with 6 the Difference, and 13 the third part of the Casks Length ; and you have 1.30, which being added to the reserved Number 111.23 gives 112.53, the Content of the Cask, that is 112 Ale Gallons and .53 parts of a Gallon, as in the fore-mention'd Example.

# A Table of Area's of Segments of a Circle.

V. Area.	V. Area.	V. Area.	V. Area.
1.0017	99.9983	26.2066	74.7934
2.0048	98.9952	27.2178	73.7822
3.0087	97.9913	28.2292	72.7708
4.0134	96.9806	29.2407	71.7593
5.0187	95.9813	30.2523	70.7477
6.0245	94.9755	31.2640	69.7360
7.0308	93.9692	32.2759	68.7241
8.0375	92.9625	33.2878	67.7122
9.0446	91.9554	34.2998	66.7002
10.0520	90.9480	35.3119	65.6881
11.0598	89.9402	36.3241	64.6759
12.0680	88.9320	37.3364	63.6636
13.0764	87.9236	38.3487	62.6513
14.0851	86.9149	39.3611	61.6389
15.0941	85.9059	40.3731	60.6265
16.1033	84.8967	41.3860	59.6140
17.1127	83.8873	42.3986	58.6014
18.1224	82.8776	43.4112	57.5888
19.1323	81.8677	44.4238	56.5762
20.1424	80.8576	45.4364	55.5636
21.1527	79.8473	46.4491	54.5509
22.1631	78.8369	47.4618	53.5382
23.1737	77.8263	48.4745	52.5255
24.1845	76.8155	49.4873	51.5127
25.1955	75.8045	50.5000	50.5000



*To Gauge Wine or Ale Cask part full.*

For the Gauging of Casks part out, I have here inserted a Table of *Area's of Segments of Circles*, taken out of Mr. *Mant's Book*, Intituled *The Practical Gauger*, to find the vacant frustum in a Cask partly full, lying with its Axis parallel to the Horizon, the Cask being taken as a Frustum of a Spheroid cut with two Planes parallel, bisecting the Axis at Right Angles.

It is requisite the Bounge and Head Diameters, Casks Length, the whole Content, and dry or wet Inches be known. Then if the question be what is wanting, or what is remaining in the Cask, divide either the dry or wet Inches by the Bounge Diameter, and the Quotient seek in the Table under *V. or Versed Sine*, against it stands a Number, which being multiplied by the Content exhibits the Vacuity, if your Dividend were the dry, or the remaining Liquor if it were the wet Inches.

*As for Example.*

Let there be a Cask, as in the former Example, whole Bounge Diameter is 30 Inches, Head Diameter 24 Inches, and the Length 50 Inches: Suppose the Wants of the said Cask to be 6 Inches. The Content of the said Cask being found by the former Rules to be 110.75 Gallons, divide 6 the dry Inches by 30 the Bounge Diameter, and the Quotient is 20, against which in the Table you have .1424 by which multiply the Content of the whole Cask 110.75, cutting off Six Figures to the right hand for Fractions, and you have the Wants of that Cask 15.7708 Gallons.

The whole Content 110.75

Tabular Number .1424

The Wants 15.770800

*Gauging*

## Gauging of Brewing VESSELS by the TABLE of CYLINDERS.

*For Gauging of Round Tuns and Coppers.*

**T**O Gauge a Tun at each Foot, and to make a Table for the same, take the Diameter 6 Inches from the top of the Tun for the Diameter of the first Foot, take the Diameter 12 Inches lower (which is 18 Inches from the top of the Tun) for the Diameter of the second Foot, and so 12 Inches lower for every Foot. But if the Tun be some odd Inches (besides even Feet) in Depth, take the Diameter in the middle of those odd Inches. Enter the Table of *Cylinders* with those several Diameters, and you shall find their Contents in Inches and Feet, which added together will make the Content of the whole Tun; and also for each Foot and Inch of the said Tun.

*As for Example.*

Suppose there be a Tun to be Gauged, whose Depth is 42 Inches, The Diameter 6 Inches from the top of the Tun is 48.4 for the Diameter of the first Foot; the Diameter 12 Inches lower, which is 18 Inches from the top, is 45.4 for the Diameter of the second Foot; the Diameter 12 Inches lower, which is 30 Inches from the top of the Tun, is 42.4 Inches for the Diameter of the third Foot; the Diameter 3 Inches from the bottom, or 39 from the top, is 41 Inches, being the Diameter for the remaining six Inches.

Now enter the Table of *Cylinders*, and against 12 Inches, and under 48.4, you have 78.29 Gallons, the Content of the first Foot; and under 48.4, and against 1, you will find 8.32, the Content of each Inch of that Foot.

H 2

Then,

Then, against 12 Inches, and under 45.4, is 68.89 Gallons, the Content of the second Foot; under 45.4 and against 1, is 5.74 Gallons, the Content of each Inch of that Foot.

Then under 42.4, and against 12 is 60.08 Gallons, the Content of the third Foot; under 42.4 and against 1 is 5.01, the Content of each Inch of that Foot.

Then, underneath 41 and against 6 is 28.09 being the Content of the remaining 6 Inches; and underneath 41 and against 1 is 4.68, which is the Content of each Inch for the remaining 6 Inches.

	B. F. Gall.			B. F. Gall.			G. on each Inch.
1 Foot, Gall. 78.29	2	0	6.29	2	1	6.29	6.52
2 Foot, Gall. 68.89	1	3	5.89	2	0	4.89	5.74
3 Foot, Gall. 60.08	1	2	6.08	1	3	4.08	5.01
Rem. 6 Inc. G. 28.09	0	3	1.09	0	3	4.09	4.68
	6	2	1.35	7	1	3.35	

Thus you have the Content of the whole Tun in Beer and Ale Measure, and likewise the Content of each Foot and Inch in Gallons and parts.

If you would Gauge a Tun for every 6 Inches, take the Diameter in the midst of each 6 Inches, that is 3 Inches from the top for the first Diameter, and 6 Inches lower, that is, 9 Inches from the top for the second Diameter; and so on for every six Inches, as was directed in the former Example.

### *For the Gauging of Oval Tuns.*

As in the Gauging of Rounds you took the Diameter for each Foot, or for 6 Inches, so here you must take the longer and shorter Diameter for each Foot,



Foot, or 6 Inches, and find for each a Mean Diameter in the Table of *Squares*, as is before directed in the Gauging of *Ovals*. The mean Diameter being found, work according to the former Directions of a Round. If you will know the whole Content of a Round Tun, work as before is directed in Gauging of a Churn Cask, they both being Frustums of Cones.

*For Gauging Coppers, and their rising Crowns.*

Take the several Diameters at 4 or 6 Inches from the top of the Copper to the top of the Crown, and find the Contents in the Table of *Cylinders*, as before is directed in Gauging of a Tun, for each part taken. Then to give the quantity of Liquor that covers the Crown, take the Diameter at the top of the Crown, and the Diameter at the bottom of the Copper, add half the Difference to the less Diameter of the Crown, then seek in the Table for the said Diameter, and look in the Column of Depth for half the Altitude of the Coppers Crown, against which, and underneath the Diameter you shall find the quantity of Liquor that covers the Crown, which being added to the several parts of the Copper before-taken, you have the Contents of the whole Copper and its several parts; by which you may make a Table as before shewed for Tuns.

In the Table of *Cylinders* you have the Content in Ale Gallons and Hundred Parts of a Gallon, to reduce which, you have here annexed two small Tables, one, to reduce Gallons into Barrels, Firkins, and Gallons of Beer and Ale; the other to reduce the Parts of a Gallon into Quarts, Pints, and Quarters of a Pint.



**TABLES** to reduce Gallons into Barrels and Firkins, and the Decimal Parts of a Gallon into Quarts, Pints, &c.

Gallons.	BEER B. F. G.			ALE B. F. G.			cent. par.	Quarts.	Pints.	Dr. of pin
8	0	0	8	0	1	0	3	0	0	1
9	0	1	0	0	1	1	6	0	0	2
10	0	1	1	0	1	2	9	0	0	3
11	0	1	2	0	1	3	12	0	1	0
12	0	1	3	0	1	4	15	0	1	1
13	0	1	4	0	1	5	18	0	1	2
14	0	1	5	0	1	6	21	0	1	3
15	0	1	6	0	1	7	25	1	0	0
16	0	1	7	0	2	0	28	1	0	1
17	0	1	8	0	2	1	31	1	0	2
18	0	2	0	0	2	2	34	1	0	3
19	0	2	1	0	2	3	37	1	1	0
20	0	2	2	0	2	4	40	1	1	1
30	0	3	3	0	3	6	43	1	1	2
40	1	0	4	1	1	0	46	1	1	3
50	1	1	5	1	2	2	50	2	0	0
60	1	2	6	1	3	4	53	2	0	1
70	1	3	7	2	0	6	56	2	0	2
80	2	0	8	2	2	0	59	2	0	3
90	2	2	0	2	3	2	63	2	1	0
100	2	3	1	3	0	4	66	2	1	1
200	5	2	2	6	1	0	69	2	1	2
300	8	1	3	9	1	4	72	2	1	3
400	11	0	4	12	2	0	75	3	0	0
500	13	3	5	15	2	4	78	3	0	1
600	16	2	6	18	3	0	81	3	0	2
700	19	1	7	21	3	4	84	3	0	3
800	22	0	8	25	0	0	87	3	1	0
900	25	0	0	28	0	4	90	3	1	1
1000	27	3	1	31	1	0	93	3	1	2
3000	55	2	2	62	2	0	96	3	1	3
3900	83	1	3	93	3	0	100	4	0	0

*To Gauge small Mash Tuns.*

For Gauging of Mash Tuns, I have here inserted a small Table, the use of it is to give the quantity of Malt by the Goods or Grains: Take the Diameter of the Goods, and in the annexed Table seek the Diameter, and against it you will find the Number, which is the quantity of Malt at one Inch deep in Gallons and parts of a Gallon, which multiply by the Depth of the Goods, and you have the quantity of the Mault wetted, in Gallons. Seek the Number of Gallons in the next little Table, which reduceth them into Quarters, Bushels, and Gallons. This will come near the truth; but the grinding of the Mault varying so, there can be no General Rule giving exacter.

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6

**TABLES**

## TABLES for MASH TUNS.

Dia.	Gall.	Dia.	Gall.	Gall.	Q.	B.	G.
21	1.56	51	9.25	8	00	1	0
22	1.72	52	9.67	9	00	1	1
23	1.88	53	9.93	10	00	1	2
24	2.04	54	10.37	11	00	1	3
25	2.22	55	10.77	12	00	1	4
26	2.40	56	11.10	13	00	1	5
27	2.59	57	11.36	14	00	1	6
28	2.79	58	12.02	15	00	1	7
29	2.99	59	12.38	16	00	2	0
30	3.20	60	12.81	17	00	2	1
31	3.40	61	13.24	18	00	2	2
32	3.64	62	13.67	19	00	2	3
33	3.84	63	14.12	20	00	2	4
34	4.11	64	14.57	30	00	3	6
35	4.35	65	15.03	40	00	5	0
36	4.61	66	15.55	50	00	6	2
37	4.87	67	15.97	60	00	7	4
38	5.13	68	16.45	70	01	0	6
39	5.41	69	16.94	80	01	2	0
40	5.69	70	17.43	90	01	3	2
41	5.98	71	17.93	100	01	4	4
42	6.27	72	18.44	200	03	1	0
43	6.58	73	18.92	300	04	5	4
44	6.87	74	19.40	400	06	2	0
45	7.20	75	20.01	500	07	6	4
46	7.53	76	20.55	600	09	3	0
47	7.86	77	21.09	700	10	7	4
48	8.19	78	21.65	800	12	4	0
49	8.54	79	22.20	900	14	0	4
50	8.87	80	22.77	1000	15	5	0

A  
**TABLE**  
TO GAUGE  
*RIGHT-LINE FIGURES,*  
A S

*Squares, Triangles, and Trapezia's;*

Giving the Contents of all Squares,

From 30 to 110 Inches in Breadth, and  
from 50 to 130 Inches in Length.

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	31	32	33	34	35
50	5.49	5.67	5.85	6.02	6.20
60	6.59	6.80	7.02	7.23	7.44
70	7.69	7.93	8.19	8.43	8.68
80	8.79	9.07	9.32	9.64	9.92
90	9.89	10.21	10.53	10.84	11.16
100	10.99	11.34	11.70	12.05	12.41
110	12.09	12.48	12.87	13.25	13.65
120	13.19	13.61	14.04	14.46	14.89
1	.10	.11	.11	.12	.12
2	.21	.22	.23	.24	.24
3	.32	.34	.35	.36	.37
4	.43	.45	.47	.48	.49
5	.54	.56	.58	.60	.62
6	.65	.68	.70	.72	.74
7	.76	.79	.82	.84	.86
8	.87	.90	.94	.96	.99
9	.99	1.02	1.05	1.08	1.11

	41	42	43	44	45
50	7.26	7.44	7.62	7.80	7.97
60	8.72	8.93	9.14	9.36	9.57
70	10.17	10.42	10.67	10.92	11.16
80	11.62	11.91	12.19	12.48	12.76
90	13.08	13.40	13.72	14.04	14.36
100	14.53	14.89	15.24	15.60	15.95
110	15.99	16.38	16.77	17.16	17.56
120	17.44	17.87	18.29	18.72	19.14
1	.14	.14	.15	.15	.15
2	.29	.29	.30	.31	.31
3	.43	.44	.45	.46	.47
4	.58	.59	.60	.62	.63
5	.72	.74	.76	.78	.79
6	.87	.89	.91	.93	.95
7	1.01	1.04	1.06	1.09	1.11
8	1.16	1.19	1.21	1.24	1.27
9	1.30	1.34	1.37	1.40	1.43

22	36	37	38	39	40
50	6.38	6.56	6.73	6.91	7.09
60	7.65	7.87	8.08	8.29	8.50
70	8.93	9.18	9.42	9.67	9.92
80	10.21	10.50	10.78	11.06	11.34
90	11.48	11.80	12.12	12.43	12.76
100	12.76	13.12	13.47	13.82	14.18
110	14.03	14.43	14.82	15.20	15.60
120	15.31	15.74	16.17	16.58	17.02
1	.12	.13	.13	.13	.14
2	.25	.26	.26	.27	.28
3	.38	.39	.40	.41	.42
4	.51	.52	.53	.55	.56
5	.63	.65	.67	.69	.70
6	.76	.78	.80	.82	.85
7	.89	.91	.94	.97	.99
8	1.02	1.04	1.07	1.10	1.13
9	1.15	1.18	1.21	1.24	1.27

20	46	47	48	49	50
50	8.15	8.33	8.51	8.68	8.86
60	9.78	9.99	10.21	10.42	10.63
70	11.41	11.66	11.92	12.16	12.41
80	13.05	13.33	13.62	13.90	14.18
90	14.68	14.99	15.32	15.63	15.95
100	16.31	16.66	17.02	17.37	17.73
110	17.94	18.33	18.72	19.11	19.50
120	19.58	19.99	20.43	20.85	21.28
1	.16	.16	.17	.17	.17
2	.32	.33	.34	.34	.35
3	.48	.49	.51	.52	.53
4	.65	.66	.68	.69	.70
5	.81	.83	.85	.86	.88
6	.97	.99	1.02	1.04	1.06
7	1.14	1.16	1.19	1.21	1.24
8	1.30	1.33	1.36	1.38	1.41
9	1.46	1.49	1.53	1.56	1.59

	51	52	53	54	55
50	9.04	9.21	9.39	9.57	9.75
60	10.85	11.06	11.27	11.48	11.70
70	12.65	12.20	13.15	13.40	13.65
80	14.66	14.74	15.03	15.31	15.60
90	16.27	16.59	16.91	17.23	17.55
100	18.08	18.43	18.79	19.14	19.50
110	19.89	20.27	20.67	21.06	21.45
120	21.70	22.12	22.55	22.97	23.40
1	.18	.18	.18	.19	.19
2	.36	.36	.37	.38	.39
3	.54	.55	.56	.57	.58
4	.72	.73	.75	.76	.78
5	.90	.92	.93	.95	.97
6	1.08	1.10	1.12	1.14	1.17
7	1.26	1.29	1.31	1.33	1.36
8	1.44	1.47	1.50	1.53	1.56
9	1.62	1.65	1.69	1.72	1.75

	61	62	63	64	65
50	10.81	10.99	11.17	11.34	11.52
60	12.97	13.19	13.40	13.61	13.82
70	15.14	15.38	15.63	15.88	16.13
80	17.30	17.58	17.87	18.15	18.43
90	19.46	19.78	20.10	20.42	20.74
100	21.63	21.98	22.34	22.69	23.04
110	23.79	24.18	24.57	24.96	25.35
120	25.95	26.38	26.81	27.23	27.65
1	.21	.21	.22	.22	.23
2	.43	.43	.44	.45	.46
3	.64	.65	.67	.68	.69
4	.86	.87	.89	.90	.92
5	1.08	1.09	1.11	1.13	1.15
6	1.29	1.31	1.34	1.36	1.38
7	1.51	1.53	1.56	1.58	1.61
8	1.73	1.75	1.78	1.81	1.84
9	1.94	1.97	2.01	2.04	2.07

	56	57	58	59	60
50	9.92	10.10	10.28	10.46	10.63
60	11.91	12.12	12.33	12.55	12.76
70	13.89	14.14	14.39	14.64	14.89
80	15.88	16.17	16.45	16.74	17.02
90	17.87	18.19	18.51	18.82	19.14
100	19.85	20.21	20.56	20.92	21.27
110	21.84	22.23	22.62	23.01	23.40
120	23.83	24.25	24.68	25.10	25.53
1	.19	.20	.20	.20	.21
2	.39	.40	.41	.41	.42
3	.59	.60	.62	.62	.63
4	.79	.80	.82	.83	.85
5	.99	1.01	1.02	1.04	1.06
6	1.19	1.21	1.23	1.25	1.27
7	1.38	1.41	1.43	1.46	1.48
8	1.58	1.61	1.64	1.67	1.70
9	1.78	1.81	1.85	1.88	1.91

	66	67	68	69	70
50	11.70	11.87	12.05	12.23	12.41
60	14.04	14.25	14.46	14.67	14.89
70	16.38	16.63	16.87	17.12	17.37
80	18.72	19.00	19.29	19.57	19.85
90	21.06	21.38	21.70	22.01	22.33
100	23.40	23.75	24.11	24.46	24.82
110	25.74	26.13	26.52	26.91	27.30
120	28.08	28.50	28.94	29.36	29.79
1	.23	.23	.24	.24	.24
2	.46	.47	.48	.48	.49
3	.70	.71	.72	.73	.74
4	.93	.95	.96	.97	.99
5	1.17	1.18	1.20	1.22	1.24
6	1.40	1.42	1.44	1.46	1.48
7	1.63	1.66	1.68	1.71	1.73
8	1.87	1.90	1.92	1.95	1.98
9	2.10	2.13	2.16	2.20	2.23



	71	72	73	74	75
70	17.62	17.87	18.11	18.36	18.61
80	20.14	20.42	20.70	20.99	21.27
90	22.65	22.98	23.29	23.61	23.93
100	25.17	25.53	25.88	26.24	26.59
110	27.69	28.08	28.47	28.86	29.25
120	30.21	30.63	31.06	31.48	31.92
1	.25	.25	.25	.26	.26
2	.50	.51	.51	.52	.53
3	.75	.76	.77	.78	.79
4	1.00	1.02	1.03	1.04	1.06
5	1.25	1.27	1.29	1.31	1.32
6	1.51	1.53	1.55	1.57	1.59
7	1.76	1.78	1.81	1.83	1.86
8	2.01	2.04	2.07	2.09	2.12
9	2.26	2.29	2.32	2.36	2.39

	81	82	83	84	85
70	20.10	20.35	20.60	20.84	21.09
80	22.97	23.26	23.54	23.82	24.11
90	25.85	26.17	26.48	26.80	27.12
100	28.72	29.07	29.43	29.78	30.14
110	31.59	31.98	32.37	32.76	33.15
120	34.46	34.98	35.32	35.74	36.17
1	.28	.29	.29	.29	.30
2	.57	.58	.58	.59	.60
3	.86	.87	.88	.89	.90
4	1.14	1.16	1.17	1.19	1.20
5	1.43	1.45	1.47	1.48	1.50
6	1.72	1.74	1.76	1.78	1.80
7	2.01	2.03	2.06	2.08	2.10
8	2.29	2.32	2.35	2.38	2.41
9	2.58	2.61	2.64	2.68	2.71

(99)

	76	77	78	79	80
70	18.86	19.11	19.36	19.60	19.85
80	21.56	21.84	22.12	22.40	22.69
90	24.25	24.57	24.88	25.20	25.53
100	26.95	27.30	27.65	28.01	28.36
110	29.64	30.03	30.42	30.81	31.20
120	32.34	32.76	33.19	33.61	34.04
1	.26	.27	.27	.28	.28
2	.53	.54	.55	.56	.56
3	.80	.81	.82	.84	.85
4	1.07	1.09	1.10	1.12	1.13
5	1.34	1.36	1.38	1.40	1.41
6	1.61	1.63	1.65	1.68	1.70
7	1.88	1.91	1.93	1.96	1.98
8	2.15	2.18	2.21	2.24	2.26
9	2.42	2.45	2.48	2.52	2.55

	86	87	88	89	90
70	21.34	21.59	21.84	22.09	22.33
80	24.39	24.68	24.96	25.24	25.52
90	27.44	27.76	28.08	28.40	28.72
100	30.49	30.85	31.20	31.56	31.91
110	33.54	33.93	34.32	34.71	35.11
120	36.59	37.02	37.44	37.87	38.30
1	.30	.30	.31	.31	.31
2	.60	.61	.62	.63	.63
3	.91	.92	.93	.94	.95
4	1.21	1.23	1.24	1.26	1.27
5	1.52	1.54	1.56	1.57	1.59
6	1.82	1.85	1.87	1.89	1.91
7	2.13	2.15	2.18	2.20	2.23
8	2.43	2.46	2.49	2.52	2.55
9	2.74	2.77	2.80	2.84	2.87

(100)

	91	92	93	94	95
90	29.04	29.36	29.67	29.99	30.31
100	32.26	32.62	32.97	33.33	33.68
110	35.49	35.88	36.27	36.66	37.05
120	38.72	39.14	39.57	40.00	40.42
1	.32	.32	.32	.33	.32
2	.64	.65	.65	.66	.67
3	.96	.97	.98	.99	1.01
4	1.29	1.30	1.31	1.33	1.34
5	1.61	1.63	1.64	1.66	1.68
6	1.93	1.95	1.97	1.99	2.02
7	2.25	2.28	2.30	2.33	2.35
8	2.58	2.61	2.63	2.66	2.69
9	2.90	2.93	2.96	2.99	3.03

	101	102	103	104	105
90	32.22	32.55	32.87	33.19	33.50
100	35.81	36.17	36.52	36.87	37.23
110	39.39	39.78	40.17	40.55	40.95
120	42.97	43.40	43.82	44.24	44.68
1	.35	.36	.36	.36	.37
2	.71	.72	.73	.73	.74
3	1.07	1.08	1.09	1.10	1.11
4	1.43	1.44	1.46	1.47	1.48
5	1.79	1.80	1.82	1.84	1.86
6	2.14	2.17	2.19	2.21	2.23
7	2.50	2.53	2.55	2.58	2.60
8	2.86	2.89	2.92	2.94	2.97
9	3.22	3.25	3.28	3.31	3.35

	96	97	98	99	100
90	30.63	30.95	31.27	31.59	31.91
100	34.04	34.39	34.75	35.10	35.46
110	37.44	37.83	38.22	38.68	39.00
120	40.85	41.27	41.69	42.05	42.55
1	.34	.34	.34	.35	.35
2	.68	.68	.69	.70	.70
3	1.02	1.03	1.04	1.05	1.06
4	1.36	1.37	1.39	1.40	1.41
5	1.70	1.71	1.73	1.75	1.77
6	2.04	2.06	2.08	2.10	2.12
7	2.38	2.40	2.43	2.45	2.48
8	2.72	2.75	2.78	2.80	2.83
9	3.06	3.09	3.12	3.15	3.19

	106	107	108	109	110
90	33.82	34.14	34.46	34.78	35.10
100	37.58	37.94	38.29	38.65	39.00
110	41.33	41.73	42.11	42.51	42.90
120	45.10	45.53	45.95	46.38	46.80
1	.37	.37	.38	.38	.39
2	.75	.75	.76	.37	.78
3	1.12	1.13	1.14	1.15	1.17
4	1.50	1.51	1.53	1.54	1.56
5	1.87	1.89	1.91	1.93	1.95
6	2.25	2.27	2.29	2.31	2.34
7	2.63	2.65	2.68	2.70	2.73
8	3.00	3.03	3.06	3.09	3.12
9	3.38	3.41	3.44	3.47	3.51



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*The USE of the foregoing TABLE.*

*To Gauge Square Tuns or Coolers.*

**L**ook on the top of the Table for the Breadth, and on the side of the Table for the Length, and at the place of meeting you have the Contents in Gallons and hundred parts of a Gallon.

*As for Example.*

Let there be a Square Back, in Breadth 47 Inches, and in Length 68 Inches: Look for 47 in the top of the Table;

Underneath that and against 60 you have 9.99

And against 8 you have 1.33

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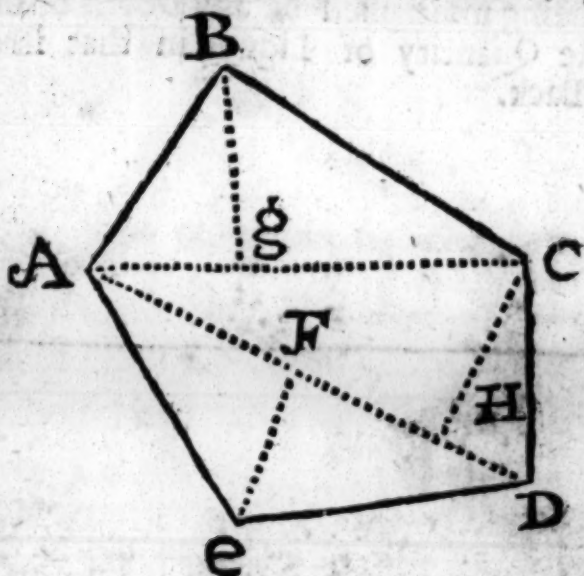
11.32

The Content of that Back or Tun at one Inch deep, which multiplied by the Depth in Inches, gives the whole Content, or by the Depth of Liquor in that Back or Tun, and you have the Content of Liquor in it.

*For Gauging of Triangles.*

If the Vessel be in form of a Triangle, enter the top of the Table with half the Perpendicular, and find the Base in the side of the Table, and underneath half the Perpendicular and against the Base you have the Content at one Inch deep, or with the whole Perpendicular and whole Base, and you have the double Content.

If a Back or Tun be a Trapezia, or any other irregular Figure, divide it into Triangles, and enter the Table with half the Perpendicular, and the Base, of each Triangle, and you have the Content; or the whole Perpendicular, and half the Base, and you have the Content: The several Triangles being added together, gives the Content of the whole upon one Inch deep.



The Figure in the Diagram being divided into three Triangles, or into a Triangle and a Trapezia, A C the Base 115 Inches, the Perpendicular B G 64 Inches; look in the top of the Table for 32, the half Perpendicular, and underneath it and against 110 Inches you have

12.48

And against 5 Inches 00.46

The Content of the Triangle A. B C 12.94

The Trapezia A C D E. The Perpendicular C H 40 and the Perpendicular E F 50 Inches; add the two Perpendiculars together, which will make

(104)

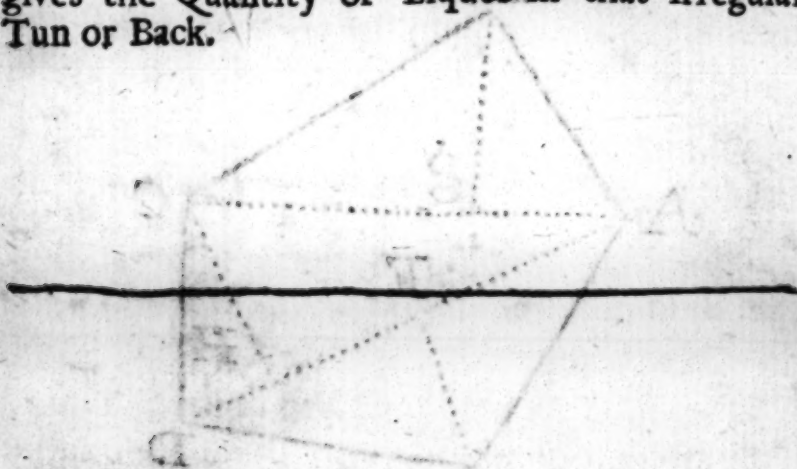
make 90 Inches, the Base 124 Inches. Enter the Table with 90, the Sum of the two Perpendiculars, and 62 being half the Base; and underneath 62, and against 90 you have

Gallons 19.78

Which add to A B C before-found 12.94

The Content of that Fig. on 1 Inch deep 32.72

Which being multiplied by any Depth of Liquor, gives the Quantity of Liquor in that irregular Tun or Back.



FINIS.

1700 Wm Owen W

A N  
APPENDIX

T O  
Mr. *COLLINS*

H I S  
*Gauging;*

B E I N G

Several useful Propositions, performed  
by the Four-Foot Rule, Semicircle and  
Compasses, with divers TABLES  
fitted to the Practical part of *Gauging*,  
with the now method of *Gauging* the  
*Worts* in small Vessels, and keeping  
the Stock-Book.

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By *R. WALKER*, Gauger.

---

*London*, Printed by *W. H.* 1688.



# APPENDIX

TO

MR. COLLIER

his

# Gauging;

BEING

Several useful Tables, containing  
by the four-foot rule, beam-compass and  
Gauging-stick, the dimensions of  
casks, barrels, and other vessels,  
with the new method of gauging  
them in small vessels, and  
the Stockholm method.

By R. WALLIS, Gauger.

London, Printed by W. M. 1733.

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TO HIS  
BRETHREN  
THE  
GAUGERS  
OF  
ENGLAND and WALES.

GENTLEMEN,

**I***F any of these following Trifles  
be useful to you, they are  
heartily presented by*

Your Loving Brother,

**R. WALKER.**

61105

BRITISH

JNT

70

2E JAW b7c QWAKJW

I may wish to mention that I have been thinking of you a great deal lately.

Is a lot of love in it

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# APPENDIX.

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**T**He Four-foot Rule, Semicircle and Compasses, ought to be very good, (and is indeed a very useful Instrument for the Gauging of Worts in small Vessels) the use of the Semicircle is so easie, that it is time lost to explain it, but the use of the Line of Numbers and Segments on the Four-Foot Rule is very serviceable in Cask-Gauging, which Propositions both Arithmetically and Instrumentally, briefly take as followeth.

## I. Proposition Arithmetically.

*To turn Barrels into Gallons, Beer-Measure.*

In 8 Barrels how many Gallons? Say by the Rule of **THREE**,

As  $1 \cdot 36 :: 8 \cdot 288$

8

288 Gallons.

## I. Proposition Instrumentally.

$1 \cdot 36 :: 8 \cdot 288$  Gallons

In words thus: Set one Point of the Compasses in 1, and extend them to 36, with that distance set the Point in 8, and it will cut 288.

II. Proposition, *To turn Gallons into Barrels Beer Measure.*



## Practical Gauging.

In 288 Gallons how many Barrels? Say, by the Rule of *THREE*, Arithmerically,

As 36 . 1 :: 288 . 8 Barrels.  
 (36) 288 (8 Barrels.)

60

2. Proposition Instrumentally, by the Rule of *THREE*.

36 . 1 :: 288 . 8 Barrels.

In words thus, set one Point of the Compaffes in 36, and extend them to 1 towards the left hand, at that distance, set one Point in 288, and it will cut 8.

To turn Barrels to Gallons, or Gallons to Barrels Ale-Measure, is the same in operation as for Beer, only 32 must be made use of instead of 36.

*Note, I should work these foregoing Propositions, rather Arithmerically, than Instrumentally.*

III. Proposition. To turn Gallons of Beer or Ale into Gallons of Wine.

In 36 Gallons of Beer, how many Gallons of Wine? Say by the Rule of *THREE* Arithmerically,

9 . 11 :: 36 . 44

36

(9) 36 (44 Gallons of Wine.)

36

# *Practical Gauging.*

3

## 3. Proposition Instrumentally, by the Rule of *THREE*.

9 . 11 :: 36 . 44 Gallons of Wine.

In words thus, set one Point in 9, and extend them to 11, with that distance set the Point in 36, and it will cut 44 Wine Gallons.

Note, the proportion between 9 and 11 was found out by Multiplying 282 (the Cubique Inches in the Ale-Gallon) by 9, and dividing the product by 231 the Cubique Inches in the Wine.

## *E X A M P L E.*

231 : 282 :: 9 . 11

	9	
231 )	2538	(10.98 Proxime 11
	2280	
	2010	
	162	

## IV. Proposition. To turn Gallons of Wine into Gallons of Ale.

In 44 Gallons of Wine, how many Gallons of Ale? Say by the Rule of *THREE*, Arithmetically.

11 . 9 :: 44 . 36

11 ) 396 ( 36 Ale-Gallons.

## 4. Proposition Instrumentally, by the Rule of *THREE*,

11 . 9 :: 44 . 36 Ale-Gallons.

*Practical Gauging.*

In words thus, set one Point in 11, and extend them to 9, with that distance set one Point in 44, and it will cut 36 towards the left hand.

V. Proposition. *Having the Diameter of a Tub or Tun, to find the Content at one Inch deep in Ale-Gallons.*

*The Rule.*: Square the Diameter, and divide the Product by 359, gives the Content at one Inch deep in Ale-Gallons.

*EXAMPLE.*

Diameter 50

50:

359) 25000 (696

3460

2290

136

*Note*, the squaring of a Number, is always Multiplying it by it self.

5. Proposition Instrumentally; say by the Rule of *THREE*,

as . 50 :: 1 . 6.96.

In words thus, set one Point in the Brass Center, under (ag) the Gauge Point for Ale, and extend them to 50 at that Distance, set one Point in 1, and turn the Compasses twice, it will cut 6.96, which is 6 Gallons and  $\frac{96}{100}$  parts of one Gallon.

VI. Proposition. *Having the Diameter and Depth of a Round Vessel, to find the Content in Ale-Gallons.*

*Arithmetically*, square the Diameter, and that multiply by the Depth, and Divide the Product by 359, gives the Content in Gallons.

# Practical Gauging.

## EXAMPLE.

Diameter 50 and Depth 12

50

2500

12

359) 30000 (83.56 Gallons.

1280

2030

2350

196

6. Proposition Instrumentally, say by the Rule of THREE,

ag . 50 :: 12 . 83.56 Gallons.

In words thus, set one Point in the Brass Center under (ag) and extend them to 50, with that Distance set one Point in 12, and repeat them twice, it will cut 83 Gallons, and  $\frac{16}{100}$  parts of a Gallon.

The 5. and 6. Propositions, the young Gauger ought to be very perfect in, both by Pen, and Rule, I will therefore lay down three or four Examples of the hardest I can at present think of.

VII. Proposition. Diameter 115, Depth 4, Arithmetically,

K 3

119



# *Practical Gauging.*

$$\begin{array}{r}
 115 \\
 115 \\
 \hline
 575 \\
 1265 \\
 \hline
 13225 \text{ Squar'd} \\
 4 \text{ Depth.} \\
 \hline
 359) 52900 (147.3 \text{ Gallons.} \\
 1700.0 \\
 2640.0 \\
 1270.0 \\
 \hline
 193
 \end{array}$$

7. Proposition *Instrumentally*, say by the Rule of *THREE*,

$$28 \text{ : } 115 :: 4 \text{ : } 147.3 \text{ Gallons.}$$

In words thus, set one Point in the Gauge Point, and extend them towards the left hand to 115, (10 being now called 100) at that Distance set one Point in 40, (which I now call 4) and repeat them twice towards the left hand, it will cut 14.73 (which must now be called 147 and  $\frac{3}{10}$ .)

VIII. Proposition. Diameter 11.5, Depth 4, *Arithmetically*,

$$\begin{array}{r}
 11.5 \\
 11.5 \\
 \hline
 575 \\
 1265 \\
 \hline
 132.25
 \end{array}$$

132.25

132.25

$$\begin{array}{r}
 4 \\
 359) 529.00 \text{ (1.47 Gallons.} \\
 \underline{1700} \\
 2640 \\
 \underline{\phantom{0000}} \\
 127
 \end{array}$$

8. Proposition *Instrumentally*, say by the Rule of *THREE*,

ag . 11.5 :: 4 . 1.47 Gallons.

In words thus, set one Point in (ag) and extend them to 11.5 (as before in the last Proposition) at that distance set one Point in 4, and repeat them twice, it will cut 1 Gallon and  $\frac{47}{100}$  parts of a Gallon.

*Note*, All the difficulty is Notation, or Numeration on the Line of Numbers; that Conquered, (which by often using will prove the best Tutor) all these Propositions and many more will be most easie and delightful.

IX. Proposition. *Having the Area or Content of a Tub or Tun, at 1 Inch deep, to find the Diameter.*

To those that can extract the Square Root, this Proposition is as easie as any of the former; but to help those that cannot, I have Calculated from 60 Inches to 100, and to every two Tenths of an Inch, as Mr. Collins did, which will be useful in the forementioned Proposition.

9. Proposition. *Area 6.96 Gallons, 1 Inch deep, what is the Diameter?* Arithmetically, say by the Rule of *THREE*,

*Practical Gauging.*

As 1 is to 2.64 the Root of 6.96;

So is, 18.95 the Gauge Point to the Diameter.

$$\begin{array}{r}
 \sqrt{\phantom{00}} \\
 1 \cdot 2.64 :: 18.95 \cdot 50 \\
 \underline{2.64} \\
 7580 \\
 11370 \\
 3790 \\
 \hline
 50.0280 \text{ Proximè.}
 \end{array}$$

	...	(Sq. Root.
46	6.9600	2.638
523	296..	
5268	2000	
	43100	
	<u>950</u>	

9. Proposition Instrumentally, by the Rule of **THREE**,

Sq.  $\sqrt{\phantom{00}}$ .

$$1 \cdot 2.64 :: ag \cdot 50 \text{ Diameter.}$$

In words thus, set one Point in 1, and extend them to 2.64 the Square Root of 6.96; at that distance, set one Point in the Gauge point, it will cut 50 the Diameter.

*Another Example done by the Table of Squares.*

Area 84.64, by the Table the Root is 9.2.

Instrumentally, say, by the Rule of **THREE**,

Sq.  $\sqrt{\phantom{00}}$ .

$$1 \cdot 9.2 :: ag \cdot 147.3 \text{ Diameter.}$$

In

In words thus, set one Point in 10, which I call 1, and extend them to 9.2, towards the left hand, with that distance set one Point in (ag) and it will cut 147.3 the Diameter.

X. Proposition. *Having the Area and Depth, to find the Diameter.*

Area 225, Depth 9.

The Rule, find the square Root of your Depth, and the Root of your Area, then say by the Rule of *THREE* Arithmetically,

Depth 9 . 225 :: ag . Diameter.

Root 3 . 15 :: 18.95 . 94.75

$$\begin{array}{r}
 \begin{array}{l}
 \sqrt{\cdot \cdot \cdot} \\
 225 \text{ (15)} \\
 25 \overline{) 125} \\
 \underline{00}
 \end{array}
 \qquad
 \begin{array}{r}
 15 \\
 \hline
 9475 \\
 1895 \\
 \hline
 3 \overline{) 284.25} \quad 94.75 \\
 \underline{14.} \cdot \cdot \\
 22 \\
 \underline{15} \\
 0
 \end{array}
 \end{array}$$

10. Proposition Instrumentally, say by the Rule of *THREE*,

$\sqrt{\quad} \quad \sqrt{\quad}$

3 . 15 :: ag . 94.7 Diameter.

In words thus, set one Point in 3, the square Root of 9, and extend them to 15 the square Root of 225, with that distance set one Point in the Gauge Point, and it will cut 94.7 Diameter.

XI. Proposition. *Having the Diameter, to find the Circumference.*

Arithmetically, say by the Rule of *THREE*, (Diameter 15.)



7 . 22 :: 15 . 47.14 or 1 . 31416 :: 15 . 47.124 Dia.  
 22 15

30 157080  
 30 31416

7) 330 (47.14 47.1240

50

10

30

2

11. Proposition Instrumentally, by the Rule of THREE,

7 . 22 :: 15 . 47.14 Diam. or 1 . 3.14 :: 15 . 47.1.

In words thus, set one Point in 7, and extend them to 22, with that distance set one Point in 15, it will cut 47.1 the Diameter; or set one Point in 10, and extend them to 3.14, with that Distance, set one Point in 15, it will cut 47.1 the Diameter.

XII. Proposition. Having the Circumference to find the Diameter.

Circumf. 47.14 Arith. say by the Rule of Three,

2

22 . 7 :: 47.14 . 15 or 3.1416 : 1 :: 47.124 :: 15

22) 330.00 (15

110

00

3.1416) 47.124 (15 Diam.

157080

00000

12. Proposition Instrumentally, say by the Rule of THREE,

22 . 7 :: 47.1 . 15 or 3.1416 . 1 :: 47.1 . 15 .

Set one Point in 22 , and extend it to 7 , with that Distance set one Point in 47.1 , and it will cut 15 towards the left hand.

Or, Set one Point in 3.14 , and extend them to 10 , which call 1 , at that Distance set one Point in 47.1 , it will cut 15 the Diameter.

## C A S K - G A U G I N G .

**I**F it be Firkin, Kilderkin, or Barrel, made according to the *London* make , the Diagonal Line will serve.

But upon other occasions, take according to Art, the Bung, Head, and Length, in Inches and tenths of an Inch, that being obtain'd, use this following Rule.

To the doubled square of the Bung, add the square of the Head, that Multiply by the Casks Length, and divide the Product by 1077 for Ale, you have the Content in Gallons.

*Example Arithmetically.* XIII. Proposition.

Bung = 23 Head = 20 Length = 27

23	20	
46	400	
529		
529		
400		
1458		
27		
10206		
2916		
39366		

1077	39366	(36.5 Gall.)
	7056	
	5940	
	555	

## 13. Proposition Instrumentally.

You must first equate the Diameter, which is done by Multiplying the Difference between the Head and Bung by 7, and Dividing by 10, and always add it to the Head Diameter, then say by the Rule of *THREE*,

$$\begin{array}{rcl} \text{ag} : \text{Eq. Diam.} :: 27 & . & 36.5 \\ \text{Bung} & = & 23 \\ \text{Head} & = & 20 \\ \hline \text{Diff.} & & 3 \\ & & 7 \end{array}$$

In words thus, set one  $\frac{2.1}{20}$  10) 21 (2.1 Point in the Gauge Point, and extend it to 22.1 Eq. Di. 22.1 the Equated Diameter, with that distance set one Point in 27 the Length, and repeat it twice, it will cut 36.5 the Content in Gallons.

XIV. Proposition. *To find the Content of this Cask in Wine-Measure.*

Work Arithmetically as you did before, till you come to Divide 39366 by 1077, but instead of making use of a Divisor, remove the Figures a place forwarder towards the right hand, and then divide the last Number by 3, and always cut off four Figures towards the right hand.

## EXAMPLE.

$$\begin{array}{r} 39366 \\ 39366 \\ 13122 \\ \hline 44.6148 \end{array}$$

14. Proposition Instrumentally.

wg . 22.1 :: 27 . 44.6 Wine-Gallons.

words thus, set one Point under (wg) the e-Point for Wine, and extend them to 1) with that distance set one Point in 27, and at them twice, it will cut 44.6 Wine ons.

ote, that any of the foregoing Propositions be done for Wine Measure; only instead of Ale Gauge Point, make use of the Wine, ch is marked with (wg)

IV. Proposition. To find the Ullage of a Cask, (what it wants of being full) whose Axis it is parallel to the Horizon; which in plain Eng- is the Cask lying along.)

This Proposition is better done by the Rule in the Pen, by reason the Segments in Printed books are Calculated for a Circle, but on the Rule they are nearer to a Spheroid, as you will find in operation.

E X A M P L E.

Bung 23	} Content 36.5	{	Wants 9
Head 20			
Leng. 27			Wets 14

15. Proposition Arithmetically. Divide always the wet or dry Inches by the Bung Diameter, if you have two figures in the Quotient, and if there be a remainder in either, above half the divisor, take the next biggest number.



## 13. Proposition Instrumentally.

You must first equate the Diameter, which is done by Multiplying the Difference between Head and Bung by 7, and Dividing by 10, always add it to the Head Diameter, then the Rule of *THREE*,

ag : Eq. Diam. :: 27 . 36.5      Bung =  
Head =

Diff.

In words thus, set one <sup>2.1</sup> 10) 21  
Point in the Gauge — 20  
Point, and extend it to 22.1 Eq. Di.  
22.1 the Equated Diameter, with that distance one Point in 27 the Length, and repeat it till it will cut 36.5 the Content in Gallons.

XIV. Proposition. *To find the Content of Cask in Wine-Measure.*

Work Arithmetically as you did before, you come to Divide 39366 by 1077, but instead making use of a Divisor, remove the Figure place forwarder towards the right hand, and divide the last Number by 3, and always cut four Figures towards the right hand.

*E X A M P L E.*

$$\begin{array}{r}
 39366 \\
 39366 \\
 13122 \\
 \hline
 44.6148
 \end{array}$$

14. Proposition Instrumentally.

wg . 22.1 :: 27 . 44.6 Wine-Gallons.

In words thus, set one Point under (wg) the Gauge-Point for Wine, and extend them to (22.1) with that distance set one Point in 27, and repeat them twice, it will cut 44.6 Wine Gallons.

*Note*, that any of the foregoing Propositions may be done for Wine Measure; only instead of the Ale Gauge Point, make use of the Wine, which is marked with (wg)

XV. Proposition. *To find the Ullage of a Cask, (or what it wants of being full) whose Axis it posited parallel to the Horizon; which in plain English is the Cask lying along.)*

This Proposition is better done by the Rule than the Pen, by reason the Segments in Printed Books are Calculated for a Circle, but on the Rule they are nearer to a Spheroid, as you will find in the operation.

E X A M P L E.

Bung 23	}	Content 36.5	{	Wants 9
Head 20				
Leng. 27				Wets 14

15. Proposition Arithmetically. Divide always the wet or dry Inches by the Bung Diameter, till you have two figures in the Quotient, and if there be a remainder in either, above half the Divisor, take the next biggest number.

*Practical Gauging.**Example.* B.D. dry V.S. Segment.

$$\begin{array}{r} 23 \overline{) 9.00} \quad (39 = 3611 \\ 2.10 \end{array}$$

B.D. wet. V.S. take V.S. Segment.

$$\begin{array}{r} 23 \overline{) 1400} \quad (60 = 61 = 6389 \\ 20 \end{array}$$

Now note the Harmony of these Numbers, the two remainders are always equal to the Bung Diameter, as 3 and 20 make 23; and the two *Versed Sines* are always equal to 100, as 39 and 61 makes 100. and the two *Segments* are always equal to 1.0000, as 3611 and .6389 makes 1.0000.

When you have the *Seg* either for the dry or wet Inc. Multiply it by the Content of the Cask, and cut off four figures towards the right hand, if there be no Decimals in the Content, you have either the wet or dry Inches, but if there be one Decimal in the Content, cut off five; for two, six, &c.

*EXAMPLE.*

V.S. Seg. Cont.

$$\begin{array}{r} \text{For the dry } 39 = .3611 = 36.5 \\ 36.5 \end{array}$$

$$\begin{array}{r} 13.18015 \end{array}$$

It wants 13 Gallons and the Fraction.

V.S. Seg. Cont.

$$\begin{array}{r} \text{For the wet } 61 = .6389 = 36.5 \end{array}$$

$$\begin{array}{r} 23.31985 \end{array}$$

In it 23 Gallons and the Fraction.

*EXAMPLE.*

*Note*, the dry and wet always make the Content

$$13.18015 \text{ dry}$$

$$23.31985 \text{ wet}$$

$$\begin{array}{r} 36.50000 \end{array}$$

*Note,*

*Note*, that Cyphers after a Decimal signifie nothing.

15 Proposition Instrumentally, say by the Rule of *THREE*, for the dry Inches,

$$100 . 23 :: 9 . 35 \text{ reserve.}$$

In words thus, set one Point in 100, and extend them to 23 the Bung Diameter, at that distance set one Point in 9, and it will cut 35 on the *Segment* Line, which reserve.

Then by a second Rule of *THREE*.

$$100 . 36.5 :: 35 . 12.8 \text{ Gallons wanting.}$$

In words thus, set one Point in 100, and extend them to 36.5 the Content of the Cask, with that distance set one Point in 35 the reserved Number, it will cut 12 Gallons, and  $\frac{8}{10}$  of a Gallon.

For the wet Inches, say by the Rule of *THREE* as before.

$$100 . 23 :: 14 . 65 \text{ reserve.}$$

In words thus, set one Point in 100, and extend them to 23, with that distance set one Point in 14, and it will cut 65 on the *Segment* line, which reserve.

Then by a second Rule of *THREE*.

$$100 . 36.5 :: 65 . 23.7 \text{ Gall. in the Cask.}$$

In words thus, set one Point of the Compass in 100, and extend them to 36.5 the Content, at that distance set one Point in 65, it will cut 23 Gallons and  $\frac{7}{10}$ .

*Note*, that on the Rule the dry will be always less, and the wet more than by the Segments of a Circle.



*Two short Tables to convert Barrels into Gallons, or Gallons into Barrels, Firkins and Gallons, Beer or Ale Measure, from 1 to 60 Barrels.*

Beer Measure.									
Bar.	0	1 Fir.	2 Fir.	3 Fir.	Bar.	0	1 Fir.	2 Fir.	3 Fir.
	Gal.	Gal.	Gal.	Gal.		Gal.	Gal.	Gal.	Gal.
1	36	45	54	63	31	1116	1125	1134	1143
2	72	81	90	99	32	1152	1161	1170	1179
3	108	117	126	135	33	1188	1197	1206	1215
4	144	153	162	171	34	1224	1233	1242	1251
5	180	189	198	207	35	1260	1269	1278	1287
6	216	225	234	243	36	1296	1305	1314	1323
7	252	261	270	279	37	1332	1341	1350	1359
8	288	297	306	315	38	1368	1377	1386	1395
9	324	333	342	351	39	1404	1413	1422	1431
10	360	369	378	387	40	1440	1449	1458	1467
11	396	405	414	423	41	1476	1485	1494	1503
12	432	441	450	459	42	1512	1521	1530	1539
13	468	477	486	495	43	1548	1557	1566	1575
14	504	513	522	531	44	1584	1593	1602	1611
15	540	549	558	567	45	1620	1629	1638	1647
16	576	585	594	603	46	1656	1665	1674	1683
17	612	621	630	639	47	1692	1701	1710	1719
18	648	657	666	675	48	1728	1737	1746	1755
19	684	693	702	711	49	1764	1773	1782	1791
20	720	729	738	747	50	1800	1809	1818	1827
21	756	765	774	783	51	1836	1845	1854	1863
22	792	801	810	819	52	1872	1881	1890	1899
23	828	837	846	855	53	1908	1917	1926	1935
24	864	873	882	891	54	1944	1953	1962	1971
25	900	909	918	927	55	1980	1989	1998	2007
26	936	945	954	963	56	2016	2025	2034	2043
27	972	981	990	999	57	2052	2061	2070	2079
28	1008	1017	1026	1035	58	2088	2097	2106	2115
29	1044	1053	1062	1071	59	2124	2133	2142	2151
30	1080	1089	1098	1107	60	2160	2169	2178	2187

## Ale Measure.

Bar.	0	1 Fir.	2 Fir.	3 Fir.	Bar.	0	1 Fir.	2 Fir.	3 Fir.
	Gal.	Gal.	Gal.	Gal.		Gal.	Gal.	Gal.	Gal.
1	32	40	48	56	31	992	1000	1008	1016
2	64	72	80	88	32	1024	1032	1040	1048
3	96	104	112	120	33	1056	1064	1072	1080
4	128	136	144	152	34	1088	1096	1104	1112
5	160	168	176	184	35	1120	1128	1136	1144
6	192	200	208	216	36	1152	1160	1168	1176
7	224	232	240	248	37	1184	1192	1200	1208
8	256	264	272	280	38	1216	1224	1232	1240
9	288	296	304	312	39	1248	1256	1264	1272
10	320	328	336	344	40	1280	1288	1296	1304
11	352	360	368	376	41	1312	1320	1328	1336
12	384	392	400	408	42	1344	1352	1360	1368
13	416	424	432	440	43	1376	1384	1392	1400
14	448	456	464	472	44	1408	1416	1424	1432
15	480	488	496	504	45	1440	1448	1456	1464
16	512	520	528	536	46	1472	1480	1488	1496
17	544	552	560	568	47	1504	1512	1520	1528
18	576	584	592	600	48	1536	1544	1552	1560
19	608	616	624	632	49	1568	1576	1584	1592
20	640	648	656	664	50	1600	1608	1616	1624
21	672	680	688	696	51	1632	1640	1648	1656
22	704	712	720	728	52	1664	1672	1680	1688
23	736	744	752	760	53	1696	1704	1712	1720
24	768	776	784	792	54	1728	1736	1744	1752
25	800	808	816	824	55	1760	1768	1776	1784
26	832	840	848	856	56	1792	1800	1808	1816
27	864	872	880	888	57	1824	1832	1840	1848
28	896	904	912	920	58	1856	1864	1872	1880
29	928	936	944	952	59	1888	1896	1904	1912
30	960	968	976	984	60	1920	1928	1936	1944

EXAMPLE of Beer.

In 28 Barrels, 3 Firkins, 7 Gallons, how many Gallons?

Look for 28 Barrels at the side, and in the Column under 3 Fir. you will find 1035 Gallons, the 7 added to it makes 1042.

Is

*In 2167 Gallons how many Barrels?*

Look for the nearest less number of Gallons to 2167 in the Gallons, you will find 2160, which is 60 Bar. the 7 added to it makes it 60 Bar. and 7 Gal.

## A

*TABLE of Allowances for Common Brewers, of Three in Twenty Three for Beer, and Two in Twenty Two for Ale, at 2 Shillings Six Pence the Barrel strong, and Six Pence the Barrel small, in Net Money, from 1 Firkin to 1000 Barrels.*

Bar.	Strong Beer.	Ale.	Small Beer.
	l. s. d. q. 23	l. s. d. q. 22	l. s. d. q. 23
1	0.00.06.2.02	0.00.06.3.06	0.00.01.1.05
2	0.01.01.0.04	0.01.01.2.12	0.00.02.2.10
3	0.01.07.2.06	0.01.08.1.18	0.00.03.3.15
4	0.02.02.0.08	0.02.03.1.02	0.00.05.0.20
5	0.04.04.0.16	0.04.06.0.04	0.00.10.1.17
6	0.06.06.1.01	0.06.09.3.06	0.01.03.2.14
7	0.08.08.1.09	0.09.01.0.08	0.01.08.3.11
8	0.10.10.1.17	0.11.04.1.10	0.02.02.0.08
9	0.13.00.2.02	0.13.07.2.12	0.02.07.1.05
10	0.15.02.2.10	0.15.10.3.14	0.03.00.2.02
11	0.17.04.2.18	0.18.02.0.16	0.03.05.2.22
12	0.19.06.3.03	1.00.05.1.18	0.03.10.3.19
13	1.01.08.3.11	1.02.08.2.20	0.04.04.0.16
14	1.03.10.3.19	1.05.00.0.00	0.04.09.1.13
15	1.06.01.0.04	1.07.03.1.02	0.05.02.2.10
16	1.08.03.0.12	1.09.06.2.04	0.05.07.3.07
17	1.10.05.0.20	1.11.09.3.06	0.06.01.0.04
18	1.12.07.1.05	1.14.01.0.08	0.06.06.1.01
19	1.14.09.1.13	1.16.04.1.10	0.06.11.1.21
20	1.16.11.1.21	1.18.07.2.12	0.07.04.2.18
21	1.19.01.2.06	2.00.10.3.14	0.07.09.3.15



Bar.	Strong Beer.	Ale.	Small Beer.
	<i>l. s. d. q. 23</i>	<i>l. s. d. q. 22.</i>	<i>l. s. d. q. 23</i>
19	2.01.03.2.14	2.03.02.0.16	0.08.03.0.12
20	2.03.05.2.22	2.05.05.1.18	0.08.08.1.09
21	2.05.07.3.07	2.07.08.2.20	0.09.01.2.06
22	2.07.09.3.15	2.10.00.0.00	0.09.06.3.03
23	2.10.00.0.00	2.12.03.1.02	0.10.00.0.00
24	2.12.02.0.08	2.14.06.2.04	0.10.05.0.20
25	2.14.04.0.16	2.16.09.3.06	0.10.10.1.17
26	2.16.06.1.01	2.19.01.0.08	0.11.03.2.14
27	2.18.08.1.09	3.01.04.1.10	0.11.08.3.11
28	3.00.10.1.17	3.03.07.2.12	0.12.02.0.08
29	3.03.00.2.02	3.05.10.3.14	0.12.07.1.05
30	3.05.02.2.10	3.08.02.0.16	0.13.00.2.02
40	4.06.11.1.21	4.10.10.3.14	0.17.04.2.18
50	5.08.08.1.09	5.13.07.2.12	1.01.08.3.11
60	6.10.05.0.20	6.16.04.1.10	1.06.01.0.04
70	7.12.02.0.08	7.19.01.0.08	1.10.05.0.20
80	8.13.10.3.19	9.01.09.3.06	1.14.09.1.13
90	9.15.07.3.07	10.04.06.2.04	1.19.01.2.06
100	10.17.04.2.18	11.07.03.1.02	2.03.05.2.22
200	21.14.09.1.13	22.14.06.2.04	4.06.11.1.21
300	32.12.02.0.08	34.01.09.3.06	6.10.05.0.20
400	43.09.06.3.03	45.09.01.0.08	8.13.10.3.19
500	54.06.11.1.21	56.16.04.1.10	10.17.04.2.18
600	65.04.04.0.16	68.03.07.2.12	13.00.10.1.17
700	76.01.08.3.11	79.10.10.3.14	15.04.04.0.16
800	86.19.01.2.06	90.18.02.0.16	17.07.09.3.15
900	97.16.06.1.01	102.05.05.1.18	19.11.03.2.14
1000	108.13.10.3.19	113.12.08.2.20	21.14.09.1.13

## EXAMPLE.

The Net Excise of 300 Barrels of
 

{	Strong-Beer is 32 12 02 00 $\frac{8}{23}$ Ale is ——— 34 1 9 3 $\frac{6}{2}$ Small-Beer is -- 6 10 5 0 $\frac{10}{33}$
---	---

The



*The short way of turning Beer to Ale, or Ale to Beer.*

In 149 Barrels, 3 Firkins, and 7 Gallons Beer-measure, how many Barrels, &c. Ale.

*Example.*

	B.	F.	Gal.	
8 )	147	3	7	Beer
	18	1	7	add
9 )	166	1	6	Ale.
	18	1	8	subtract
	147	3	7	Beer.

This to the Ingenious is explain'd enough.

The Ninth and Tenth Proposition may be done thus,

9. Prop. Multiply the Area 6.96 by 359, and Extract the Square Root, you have the Diameter.

*Example.*

6.96	
359	
6264	
3480	
2088	Diam. Proxime.
...	
2498.64	(49.9
898	
9764	
863	

To *Pro.* Multiply the *Area* 225 by 359, and divide the Product by the depth 9, and Extract the Sq. Root, you have the Diam.

225	184	8975 ( 94.7
359	1887	875
2025		13900
1125		691
675 .		

$$\begin{array}{r}
 9) 80775 \quad (8975 \\
 \underline{87} \phantom{00} \\
 67 \phantom{00} \\
 \underline{45} \phantom{00} \\
 0
 \end{array}$$

Having the Diameter of a Circle to find the *Area* in Square Inches,

Say by the Rule of *THREE*,

As 1

is to 3.1416,

So is the Square of  $\frac{1}{2}$  the Diameter to the *Area*.

*Example* Diam 20.

1 . 3.1416 ::	$\frac{1}{2}$ D. <i>Area</i> .
100	10 . 314.16
314.1600	100

Having the *Area* in Inches, to find the Diameter.

Say

[22]

Say by the Rule of *THREE*,

As 3.1416

is to 314.16

So is 1

to the Sq.  $\sqrt{\quad}$  of  $\frac{1}{2}$  the Diameter.

Example.

Diam.

$$3.1416 \cdot 314.16 :: 1 \cdot 20$$

$$\begin{array}{r} 64 \\ 122 \\ \hline 128 \\ 128 \\ \hline 256 \\ 7808 \end{array}$$

$$\begin{array}{r} 3.1416 \cdot 314.16 \cdot 100 \cdot \begin{pmatrix} 10 \\ 10 \end{pmatrix} \\ \hline 000.00 \quad 20 \end{array}$$

He that performs this last Proposition, must well understand Division in Decimals.

By reason the Table of Circles *Area's* are Calculated only to even Tenths, if you desire to have odd, work thus,

Suppose in a close Cask the Equated Diameter be 22.1 and length 27, first take for 22 and depth 27 which makes 36.4 then for 22.2 makes 37

add them together, and 73.4  
take the  $\frac{1}{2}$  which is 36.7

In a Tub the Diameter 50.5

Depth 30

Under 50.4, and Depth 30 makes 212.24

Under 50.6 and Depth 30 makes 213.92

4 26 16

. Equal to 50.5 = 213.08

The

*The Description and use of the*  
**STOCK-BOOK.**

**I**N the head Line you have 1 . 3 . 5 . 7 . 9 . which are the numbers of the Cask, the odd numbers are only set down, the even numbers being included, underneath are the Gallons they hold, number 1 holds 108 Gallons, and so to 10, which holds 18 Gallons, the next under Diameter and Wet, is called By-Worts, and is either cast up by the Table of *Cylinders*, or by the Rule; the next the *Area* of the M.T. on 1 Inch deep in Gallons, the next is 1 B. 2 B. and 3 B. 1 B. holds on each Inch 12.6 Gallons, and so the rest, the next is the three Gale Tuns, the Diameter and Depths you have of each in the head, and the *Area's* in the same line where the contents of the Cask are.

I come *July* the 22<sup>d</sup>, and find Number 1 half full, Number 5 empty, Number 9 and 10 full; at the same time they were Brewing, the next Survey is on the 23, and I have the several Diameters and Depths, which computed, makes 62 Gallons, which I carry under By-Worts, the 1 B. dipt at that time 12.6 Inches which makes 63, and that added to 62 the By-Worts makes 125, which I place in the last Column, the next is on the 24, and is in the two Tuns, and in the 10<sup>th</sup> Column is from the Cask on the 26, and in the 10<sup>th</sup> Column charge is made from 128 the Worts.

The next Brewing is charged on the 28, and the Third Brewing is charged on the Cask on *August* 4.



$$\begin{array}{r}
 1.67 \\
 7 \\
 \hline
 11.69
 \end{array}
 \qquad
 \begin{array}{r}
 825 \\
 11.8 \\
 28. \\
 \hline
 100.1
 \end{array}
 \qquad
 \begin{array}{r}
 3910 \\
 390 \\
 \hline
 717
 \end{array}$$
  

$$\begin{array}{r}
 1.25 \\
 208 \\
 \hline
 1000
 \end{array}$$
  

$$\begin{array}{r}
 2580 \\
 \hline
 280
 \end{array}$$

### Errata in the Appendix.

**I**N Page 4. line 14. for 696 read 6.96. p. 6. l. 21.  
 for 14.73 r. 147.3. l. 27. place the 5 of 1265.  
 under the 7 in 575. p. 8. l. 14. for 950 read 956. l. 27.  
 for 147.3 read 174.3. p. 9. l. 5. for 147.3 read 174.3.  
 l. 16. place the 5 of 1895 under the 7 in 9475. p. 10.  
 l. 1. for 31416 read 3.1416.

$$\begin{array}{r}
 27 \\
 42 \\
 \hline
 69
 \end{array}$$
  

$$\begin{array}{r}
 8.6 \\
 11. \\
 \hline
 19.6
 \end{array}$$

# The STOCK-BOOK.

Mr. JOHN JONES of *Swich*.

1 3 5 7 9							Mn Tn.											
1684.		108 108	64 64	56 56	48 32	18 18	Diam.	Wet.	Diam.	Wet.	Diam.	Wet.	60 12	1 B. 12.6	2 B. 16.2	3 B. 10	1 G.T. 2.85	2 G.T. 3.6
<i>July.</i>	22	$\frac{1}{2}$ I	—	0I	$\frac{1}{2}$ I	II	—	—	—	—	—	—	—	—	—	—	—	—
	23	$\frac{1}{4}$ I	$\frac{3}{4}$ I	0I	$\frac{1}{4}$ I	II	30	10	32	8	27	7	—	5	—	—	—	—
	24	0I	I	0I	0I	$\frac{1}{2}$ I	—	—	—	—	—	—	2d	—	—	—	16.8	22.2
	26	0I	$\frac{1}{4}$ I	II	$\frac{1}{2}$ I	$\frac{1}{2}$ I	and 1 Barrel of Small.						3d	—	—	—	—	—
	28	$0\frac{3}{4}$	0I	$\frac{3}{4}$ I	$\frac{1}{2}$ I	—	4	6	50	7	30	—	8	3.5	4	—	13	10
	30	$1\frac{1}{2}$	$\frac{1}{2}$ I	$\frac{1}{2}$ I	II	$1\frac{1}{2}$	and 1 Barrel of Small.						2d Gauge	—	—	—	—	—
<i>Aug.</i>	2	$1\frac{1}{2}$	0I	$\frac{1}{4}$ I	II	00	40	4	50	5	60	8	M.T. 203	—	—	—	—	—
	4	$1\frac{3}{4}$	0I	II	$\frac{3}{4}$ I	10	and 1 Barrel of Small.						2d Gauge	—	—	—	—	—

*201.6*  
*60*  
*41*



# The STOCK-B

Mr. JOHN JONES of

		1	3	5	7	9							Malh
1684.		108 108	64 64	56 56	48 32	18 18	Diam.	Wet.	Diam.	Wet.	Diam.	Wet.	60 Diam. 12 An
July.	22	$\frac{1}{2}I$	$\frac{1}{2}I$	$\frac{1}{2}I$	$\frac{1}{2}I$	$\frac{1}{2}I$	—	—	—	—	—	—	—
	23	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	30	10	32	8	27	7	—
	24	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	—	—	—	—	—	—	2d Gauge
	26	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	and 1 Barrel of Small.						3d Gauge
	28	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	4	6	50	7	30	—	—
	30	$\frac{1}{2}I$	$\frac{1}{2}I$	$\frac{1}{2}I$	$\frac{1}{2}I$	$\frac{1}{2}I$	and 1 Barrel of Small.						2d Gauge
Aug.	2	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	40	4	50	5	60	8	M.T. 2d
	4	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	$\frac{1}{4}I$	and 1 Barrel of Small.						2d Gauge

2 01.6  
6 6  
6 6  
6 6

# BOOK.

Appendix 25.

of Ipswich.

ah Tun.

1 G. T. Diam. 32, Depth 40.  
2 G. T. Diam. 36, Depth 40.  
3 G. T. Diam. 40, Depth 41.

Diam.	Wts	1 B.	2 B.	3 B.	1 G.T.	2 G.T.	3 G.T.	A.	G.	Vi.	Number of Gallons.
		12.6	16.2	10	2.85	3.6	4.46				
		—	—	—	—	—	—	—	—	—	Brewing.
	5	—	—	—	—	—	—	—	—	—	125
Gauge.	—	—	—	—	16.8	22.2	—	—	—	—	128 charge.
Gauge	—	—	—	—	—	—	—	4	—	1	122
	8	3.5	4	—	13	10	—	—	—	—	265 charge.
Gauge.	—	—	—	—	—	—	—	8 $\frac{1}{4}$	1	1	256
T, 20	13	—	—	—	—	—	10	—	—	—	177
Gauge	—	—	—	—	—	—	—	5 $\frac{1}{2}$	6	1	182 charge.

401 - 20  
411 - 5





[illegible]



100 23-15-0  
50 11-17-6  
40 09-10-0  
30 07-02-8  
20 04-20-0

19 4-10-3 4-11-5 4-12-4 4-13-9  
18 4-5-6 4-6-0 4-7-10 4-8-4  
17 4-0-0 4-1-11 4-2-13 4-3-4  
16 3-16-0 3-17-3 3-18-10 3-19-6  
15 3-11-3 3-12-5 3-13-13 3-14-9  
14 3-06-6 3-07-0 3-08-10 3-09-5  
13 3-01-9 3-02-11 3-03-13 3-04-5  
12 2-17-0 2-18-2 2-19-4 2-20-0  
11 2-12-3 2-13-5 2-14-7 2-15-9  
10 2-07-6 2-08-0 2-09-10 2-10-11  
9 2-02-9 2-03-11 2-04-12 2-05-16  
8 1-10-0 1-11-19 1-12-24 1-13-01  
7 1-13-3 1-14-5 1-15-7 1-16-9  
6 1-08-6 1-09-10 1-10-12 1-11-16  
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14 0-69-6 0-70-10 0-71-13 0-72-17  
15 0-74-3 0-75-5 0-76-7 0-77-9  
16 0-79-0 0-80-2 0-81-4 0-82-6  
17 0-84-3 0-85-5 0-86-7 0-87-9  
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[illegible]



15 10 00  
 35 79 00  
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 20 63 00  
 15 14 00  
 27 60 00  
 41 72 00  
 611 30 00  
 14 422 00  
 05 00 00  
 06 21 00  
 11 00 00